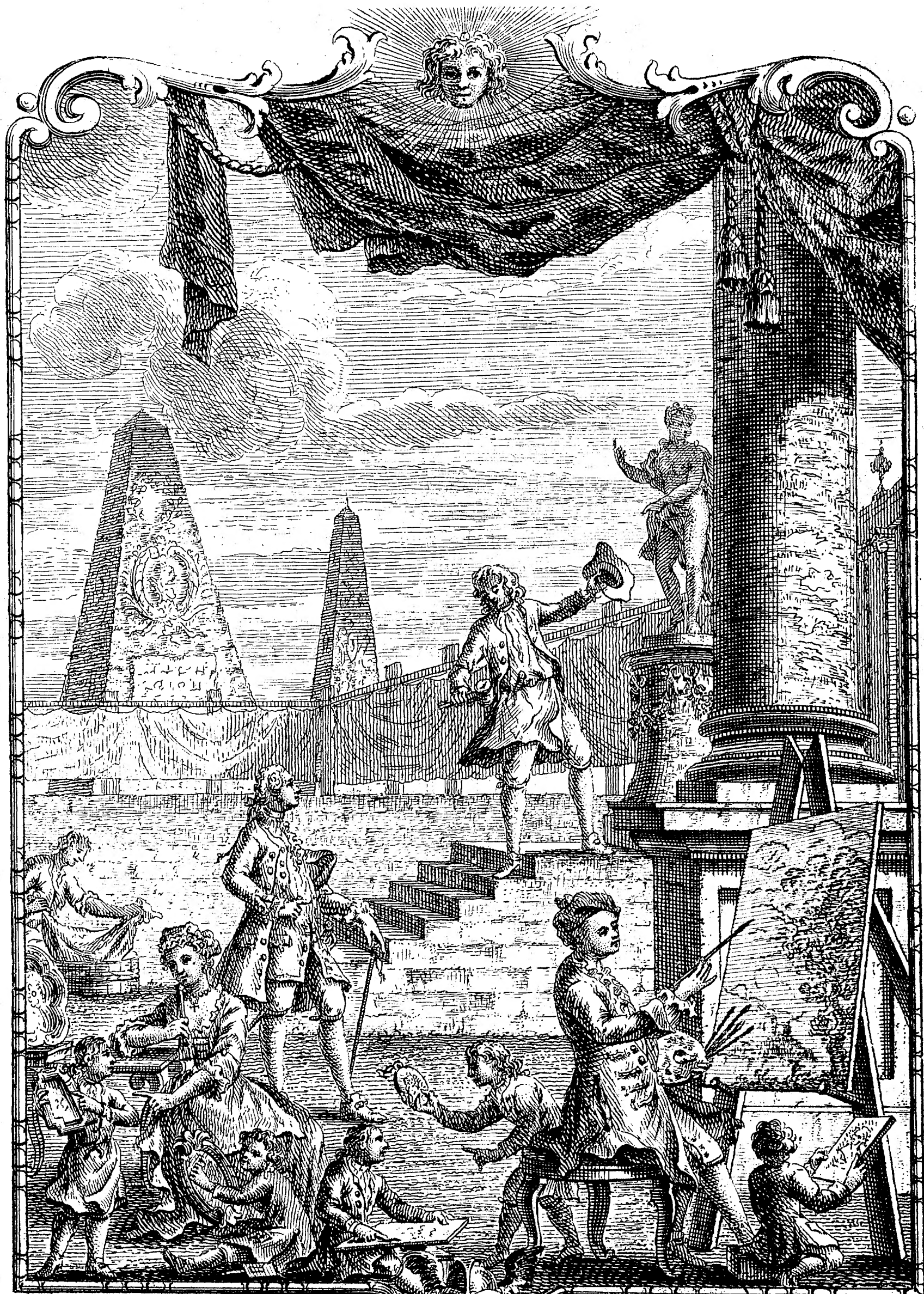


Bamboccio. V. Laer.  
 Bassano. V. Ponte.  
 Borgognone. V. Cortesi.  
 dalle Battaglie. V. Angelo.  
 Caravaggio. V. Merigi.  
 Campidoglio. V. Angelo.  
 Cento. V. Provenzale.  
 Cortona. V. Beretini.  
 Cortona. V. Signorelli.  
 Dominichino. V. Zampieri.  
 Giorgione. V. Castell.  
 Guercino. V. Barbieri.  
 Micarino. V. Beccafumi.  
 Pellegrino. V. Tifaldi.  
 Pordenone. V. Regillo.  
 Raphael. V. Sancio.  
 Spagnaletto. V. Ribera.  
 Titiano. V. Vecelli.









*J. Devoto Inv.*

*Toms Sulp.*

Printed for  
C. Hitch and C. Davis in Paternoster  
Row and S. Austen in S.<sup>t</sup> Paul's  
Church Yard.

# *Dictionary Polygraphicum:*

Or, The Whole

## B O D Y of A R T S

Regularly Digested.

C O N T A I N I N G,

- I. The ARTS of *Designing, Drawing, Painting, Washing Prints, Limning, Japanning, Gilding* in all their various kinds. Also *Perspective*, the Laws of *Shadows, Dialling, &c.*
- II. *Carving, Cutting* in Wood, Stone; *Moulding and Casting* Figures in Plaister, Wax, Metal; also *Engraving*, and *Etching*, and *Mezzotinto*.
- III. A brief historical Account of the most considerable *Painters, Sculptors, Statuaries*, and *Engravers*, with those Cyphers or Marks by which their Works are known.
- IV. An Explanation of the Emblematical and Hieroglyphical Representations of the Heathen Deities, Powers, Human Passions, Virtues, Vices, &c. of great Use in History Painting.
- V. The Production, Nature, Refining, Compounding, Transmutation and Tinging all sorts of Metals and Minerals of various Colours.
- VI. The ARTS of Making, Working, Painting or Staining all sorts of Glass and Marble; also Enamels, the imitation of all sorts of Precious Stones, Pearls, &c. according to the Practice both of the Antients and Moderns.
- VII. *Dying* all sorts of Materials, Linen, Woollen, Silk, Leather, Wood, Ivory, Horns, Bones; also *Bleaching* and *Whitening* Linen, Hair, &c.
- VIII. The ART of *Tapestry-Weaving*, as now performed in *England, Flanders* and *France*, either of the high or low Warp; also many other curious Manufactures.
- IX. A Description of Colours, Natural and Artificial, as to their Productions, Natures or Qualities, various Preparations, Compositions and Uses.
- X. The method of making all kinds of *Inks*, both Natural and Sympathetical; and also many other Curiosities not here to be specified, whereby this is rendred a more Compleat Work than has hitherto appear'd in any language.

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*Adorned with proper Sculptures, curiously Engraven on more than fifty Copper Plates.*

---

V O L. I.

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L O N D O N:

Printed for C. HITCH and C. DAVIS in *Pater-noster Row*, and  
S. AUSTEN in *St. Paul's Church-Yard*. MDCCXXXV.



# P R E F A C E.

**T**HE Arts to which these volumes are an introduction, are so amiable in themselves, and unfold such a variety of advantages and delight to mankind, that we hope our endeavours to range them in a regular view, and render them intelligible even to a moderate capacity, will not be thought an unnecessary undertaking.

We have cast this work into the form of a Dictionary, because we judged such a disposition the most methodical of any, and as we are sensible that clearness of expression is essential to those performances which are published with a view to illustrate the Arts and Sciences, we have always endeavoured to treat our subject with that perspicuity, as we flatter ourselves will not disappoint the reader's expectation of improvement.

It has been our constant method to consider each particular Art in the rudiments from which it flows, and to trace it from those original principles to its perfection: In the conduct of which design, we have advanced in that regular gradation from rule to rule, as is necessary to convey a distinct idea of every circumstance which deserves observation, and, at the same time, have endeavoured to preserve the due medium between an affected conciseness which is generally obscure, and a loose redundancy which always satiates.

We have likewise, for the satisfaction of the curious, given a particular account of the materials employed in those mechanic arts which have a place in this work; and have added directions for proper applications of them in every branch of the Arts to which they are appropriated: We have also considered these materials, not only in their first shape of nature, but have attended them through every process of art, preparatory to their last forms in the shops of Colourmen, Druggists, and other tradesmen; and have laid down proper rules for distinguishing the pure and genuine materials from those which are adulterated and spurious.

As

*As it was our intention to render this work, at once, instructive and entertaining, we have interspersed several historical accounts of the greatest masters in these Arts; we have marked their several characters and peculiar turns of genius; we have pointed out their particular methods of study, and considered the amazing heights to which they raised the various Arts they professed; in a word, we have introduced all the usefull variety we could collect, to make this article please the imagination, and inform the judgment.*

*Our observations have been carefully collected from the most celebrated authors. and digested into such an easy and regular series of instructions, that those Gentlemen who are disposed to consider them with attention, will be agreeably surprized at their speedy proficiency in such engaging studies, and will find the theory and practic part of these beneficial Arts attainable much sooner than they might possibly expect. We may likewise add that the expence of purchasing, and the tedious fatigue of consulting a vast number of volumes on these subjects will be rendered unnecessary, since we have included, in this work, all the material precepts and informations that are to be drawn from every valuable treatise on these subjects, already extant.*

*As the intention therefore of this work is to familiarise these charming Arts to the laudable curiosity of all who wish for a competent proficiency in them; and as we have formed it, from the best authorities, in such a system of instruction as has a direct tendency to produce that effect, in a more agreeable and compendious manner than has yet been attempted, we hope no objection of any moment can be rais'd against it, to prevent its obtaining a favourable reception from the publick.*



# T H E

## Polygraphick Dictionary.

### A.

**A.** B. These two letters join'd together with an E issuing out from the B, is the mark of *Alexander Badiale* of *Bologna*, painter and engraver.

AB. BL. *in*, stand for *Abraham Bloemart*, an indefatigable *Dutch* engraver.

A. BOTH, stands for *Andrew Both*.

A. C. P.

A. C.

AGOS. C.

AG. C.

AG. Bononiæ,

} Are all the marks of *Augustino Caracci* of *Bologna*, a celebrated painter and engraver.

ACADEMY of PAINTING was establish'd in *France*, about sixty years since, in the reign of king *Lewis XIV*, under the cardinal *Mazarine*, the first protector thereof; and the chancellor *Seiguer*, vice-protector.

It consists of a director, a chancellor, four rectors, a treasurer, twelve professors; counsellors, a secretary; a professor of anatomy, another of geometry and perspective.

Persons are admitted into this academy, either in quality of *Painters* or *Sculptors*. The *Painters* are admitted according to their respective talents; there being a distinction made between those who work in history, and those who only paint portraits or landskips, or beasts, or fruits, or flowers, or paint in miniature, or only design; or engrave or carve.

ACHELOUS the river, is describ'd by *Ovid* adorn'd with a garland of reeds willow and the like: having two urns or earthen pitchers, the one empty, and the other pouring forth water; and having on his head two horns, the one broken and the other whole.

This river as it is the most famous of all *Greece*, so it divides *Ætolia* from *Arcadia*, and then falls into the sea.

This representation is taken from the fable of *Hercules*, who combated him in the likeness of a bull for the sake of his wife *Dejanira*, and broke one of his horns; there turning both its streams into one, for which reason one of the urns is represented empty.

**ACTION** in *Painting* and *Sculpture* is the posture of a figure; or the action it is suppos'd to be in; express'd by the disposition of its parts, or the passion appearing in its face, see **ATTITUDE** and **EXPRESSION**.

A. D. J. F, signifies *Anthony Jacquart fecit*. He engrav'd several pieces.

**ADAMO**, a sculptor of *Mantua*, engrav'd the angels of *Michael Angelo Buonoroti*, in seventy three plates, and work'd for other masters, and mark'd his plates with the mark. See plate No. 1.

**ÆGIPAN**, [of 'Αἴξ ἄγρος, gr. a goat] a denomination given to the Heathen god *Pan* and the *Panes*, on account of their being represented in painting with the horns, legs, feet, &c. of that animal.

*Salmasius* in his notes on *Solinus*, takes *Ægipan* to have signified the same in *Lybia* with the *Sylvans* among the *Romans*.

*Vossius* opposes this opinion, and shews that the *Ægipanes* had not faces like men as the *Sylvans* had; but like Gods. In effect the whole upper part of the body resembled that animal; and as to the lower, they painted it with a fish's tail.

**ÆE. ADAM ÆLZHEIMER**, who wrought with *Peter Bruguel*, mark'd his pieces with the preceding mark. See plate No. 1.

**ÆNEAS**, the *Trojan* prince, is painted in a purple mantle trim'd with gold.

**ÆOLUS** is depicted with swoln, blubb'd cheeks, like one that with main force strives to blow a blast; two small wings upon his shoulders, and a fiery, high countenance.

*He is by the poets feign'd to be the god and ruler of the winds, whose descriptions are to be found under their proper articles alphabetically.*

**ÆS USTUM**, to make. Take bits or thin leaves of copper fifteen ounces, sulphur in powder ten ounces, sea salt finely powdered fifteen ounces, fill the crucible by laying in layer upon layer; put it into a furnace of live coals, and let it stand till the sulphur is wholly consum'd; then take it out, and it will be of an iron grey, but reddish within; it gives a noble fine tincture to glafs.

*Another*



## A F R

*Another Æs Ustum.* Take thin plates of the reddest copper (*i. e.* the rose copper) make it red hot, and extinguish it in urine, in which common salt has been dissolv'd: reiterate this operation till it becomes of the colour of gold, both within and without; after which cement those places with this powder. Or

Take sulphur two pound, salt petre two pound, vitriol calcin'd to redness one pound, reduce all to a powder, put the plates with the powder into a crucible layer upon layer, cover it with another crucible having a whole in the bottom, lute them together, and being dry, put them into a circulatory fire (having hot embers underneath) for six hours: for the first two hours let the fire be a foot distant from the crucible; the second two hours let it be half a foot from the crucible, and the last two hours let it be close to the crucible, cover it.

Take care that the fire be not too violent, that the matter may not melt, for if it does it is spoil'd. When it is cold reduce it to a fine powder, wash it, dry it, and keep it for use.

There are other curious persons who make an *Æs ustum*, yet finer than this, and more penetrating in colours; but the preparation is more costly and requires more time; for instead of *brimstone* and *salt-petre*, they make use of a purified *sulphur*, and fix'd with *sal-armoniac*; and instead of ordinary *red vitriol* they use *Roman vitriol*, which they prepare with the lee of urine, and a fusil salt; which they afterwards put into a reverberatory.

But since the before mentioned will serve well enough for colouring glass, and are easier to make, I shall omit giving the preparation of this.

A. F. is a mark found in some plates of *Albert Durer*.

AFFECTION in painting is describ'd like a comely ancient lady, winged, holding in her hands a woodcock, and at her feet a lizard.

Her age shews she is constant, winged because affection is produc'd in an instant, the cock and lizard are emblems of *good will* by instinct; her posture shews, that benevolence between two for a long time, becomes at last one true friendship.

AFRICA is represented by a *Blackmoor* woman almost naked, having frizzled hair, an elephant's head for a crest, a necklace of coral, and pendants of the same; at her ear a scorpion; holding in her right hand a *cornucopia*, with ears of corn in her left hand; a fierce lion by her on one side, and a viper and serpent on the other; she is naked, because it does not

## A G R

abound with materials for clothing ; the elephant is an animal with which *Africa* abounds ; as it also does in vipers and serpents.

A. G. stands for *Albert Glochentonius*, in the twelve plates representing our Saviour's passion.

AGATE, a precious stone partly transparent and partly opake. There are various kinds of *Agates* ; which according to their colours, degrees of transparency, &c. have different names ; as the *onyx*, the *chalcedony*, the *black* and the *German-Agates*. The *Agate* has commonly a reddish tint ; but is finely variegated with spots and stains, many of which seem very naturally to represent woods, rivers, trees, flowers, fruits, animals, &c.

The *sardines* and *sardonix Agates* are very valuable, the latter is of a *sanguine* colour, and is divided into zones which seem as if they had been painted by art.

*Agate* has always been esteem'd for seals, as being a stone that no wax will stick to.

Gold wire drawers burnish their gold with an *Agate*, whence the instrument us'd for that purpose is call'd an *Agate*.

AGE in general is represented in painting by a lady in a garment of three colours, holding up her hands, with a sun in her right hand, and a moon in her left ; the right being higher than the left ; and below a basilisk erected.

The changeable habit denotes the changing of the minds and purposes of several ages ; the sun and moon intimate their regulating the three principal members, the head, heart and liver, where the vital, animal and natural virtues reside.

ROBERT AGGAS, a good *English* landskip painter both in oil and distemper ; very skilful in architecture, in which kind he painted many scenes for the play-house in *Covent-Garden* ; there are not many of his pictures extant amongst us ; of those that are the most considerable, is a piece of landskip presented by him to the company of painter stainers, (whereof he was a member) and which now hangs in their hall ; he was reckoned amongst the best of our *English* landskip painters ; and died in *London* 1679, and about sixty years of age.

AGOSTINO a *Venetian*, scholar to mark *Antonio Raimondi* in *Rome*, engrav'd the paintings of *Raphael Julio Romano*, and others, us'd the mark plate No. 2. he also mark'd with the letters AVI, or AV. 1525.

AGRICULTURE is represented in painting with a homely face, but comely notwithstanding ; clothed in a green gown,

## A L G

gown, crown'd with a garland of ears of corn, holding a zodiack in her left hand, and a shrub in her right; and a plough-share at her feet.

Her verdant robe betokens *hope*, without which no body would labour. The twelve signs of the zodiack, intimate the different seasons which the tiller ought to observe; the plough is the most necessary instrument in agriculture.

A. L. P. I. stands for *Anthony Licinio Porduore inv. Edward Tualetti, sc.*

ALABASTER, a kind of stone, softer than marble, yet harder than plaister of *Paris*.

It is found of all colours; some extremely white and shining, which is the most common; some red like coral; and other call'd *onyx*, from its colour; which resembles that of the *onyx*, though very different from it in nature. See ONYX.

*Alabaster* cuts very smooth and easy, and is much us'd by sculptors for little vases, columns, &c.

It is also sometimes employ'd like plaister of *Paris*: in order to which they burn and calcine it; after which, mixing it up with water to a thin consistence, it is cast in a mould, where it readily coagulates into a firm body.

*Francisco* ALBANI a *Bolognese*, born in the year 1578, a disciple of the *Carraches*, one of the most agreeable pencils in the world in all parts of painting, but principally admir'd for his performances in little, and had a peculiar genius for naked figures; and the better to accomplish himself for that purpose married a beautiful woman, and us'd himself to the designing of naked *Venus's*, the graces, nymphs, &c. and little children, cupids dancing and playing in all the variety of postures imaginable. He died *anno* 1660, aged eighty two years.

CHERUBINO ALBERTO *Borghesiana*, i. e. *de Borgo*, S. *Sepulchro* us'd the two marks you will see in the plate No. 3, 4. He engrav'd the works of *Michael Angelo* and others.

ALBERT ALDOGRAFT of *Westphalia*, a famous engraver, mark'd his pieces with the mark in the plate No. 5.

ALGA is a plant that grows by the sea side, and thence is call'd *sea weed*, or *sea moss*; it is found on most coasts, and is by some accounted the excrement or refuse of the sea.

This herb, when gathered, if it be kept fresh and moist some time, will shew afterwards its white salt on the surface of its leaves. The inhabitants of those parts nigh the sea commonly gather it together on the shore, and dry it by often turn-

## A L L

ing it in the sun as hay is made ; after it is dry they burn it, and its ashes yield an *Alkali* salt, fit for making *glass* and *alum*. The *English* make use of it for both, and call the ashes *kelp*.

ALEXANDER ALGARDI a sculptor of *Bologna*, mark'd with the mark No. 6. in a conclusion engraven by *Francis du Poylli* in 1653, but at other times made use of the same mark, but without the G.

ANTONIO ALLEGRI DA CORREGGIO, born in the year 1494, disciple of *Frari di Modena*, liv'd in *Lombardy*, excell'd in history painting, died in the year 1534, aged forty years.

ALLUM, } is a principal ingredient in *colouring* and *dying* ;  
ALUM, } neither of which in many cases can be well perform'd without it.

It is a kind of mineral salt of an acid taste, leaving in the mouth a sense of sweetness, with a considerable degree of astringency.

*Allum* is either native or factitious, the natural is found in the island of *Milo*, being a kind of whitish stone very light, friable and porous, and streak'd with filaments resembling silver.

Factitious *Allum* is made after different manners, according to the different materials whereof it is made.

*Allum* is of divers sorts, *red*, *Roman*, *plumose*, *saccharine* and *burnt*, the three last of which are not proper native *Allums*.

*Allum* is principally produc'd in *England*, *Italy* and *Flanders*.

The *English Allum* call'd also *Roche Allum*, is made from a bluish mineral stone found plentifully in the hills of *Yorkshire* and *Lancashire*.

The stone they calcine on a hearth or kiln, and steep it successively in several pits of water ; and then boil it for about twenty four hours : lastly, letting it stand for about two hours, the impurities subside and leave a pure liquor ; which being remov'd into a cooler, and some urine added to it, begins in three or four days to gather into a mass ; which being taken out, wash'd and melted over again, is fit for use.

In the *Allum* works at *Civita Vecchia*, the process is as follows : The stone, which is of a ruddy hue, being calcin'd, they boil and dissolve the calx in water ; which imbibing the salt, *i. e.* the *Allum*, separates itself from the useless earth. Lastly, leaving the water thus impregnated with salt to stand some time, it crystallizes of itself, like *tartar*, about a ~~hott~~ <sup>hott</sup>, and makes what they call *Roche* or *Roman Allum*. The

## A M A

The *Swedish Allum* is made of a mineral which contains a great deal of sulphur and vitriol, not to be taken away; but by calcination or distillation.

The matter remaining in the iron vessels, us'd in separating the sulphur from the mineral, being expos'd to the air for some time, becomes a kind of bluish ashes, which they lixivate, crySTALLIZE and convert into *Allum*.

*Allum* in colouring and dying, serves to bind the colour upon the stuffs, and has the same use there, that gum water and glutinous oils have in painting; it likewise disposes stuffs to take colour, and adds a degree of briskness and elegancy to them, as is seen visibly in cochineal and the grain of scarlet.

It also preserves paper, that has been dy'd in its water, from sinking when wrote upon.

ALLUM } WATER, boil four ounces of *Allum* in a quart  
ALUM } of rain or river water, till the *Allum* is dissolved and let it stand twenty four hours.

With this water wash prints you design to colour, and it will fix the paper so, that the colours will not sink or run in it, when you lay them on, and will help likewise to brighten your colours.

If your paper is very thin and loose, then wash it with this *Allum* water four or five times, letting it dry between every time, and your paper must always dry before you lay on any of your colours.

But take notice, that if you design to varnish your prints after they are colour'd, then wash the prints all over equally with white starch before you colour them, and when that is dry lay on the colours.

*The method of ALUMING of stuffs, particularly for dying REDS.* Hang rain or running water over the fire, adding one third part of the starch or bran water; put in for every pound of stuff two ounces of *Allum*, and an ounce of tartar, and when it boils and froths, first skim it, and then put in the stuff, stir it very well about for an hour, then take it out and rinse it.

The quantity of *Allum* must always be double to that of the tartar; some dyers reject *red wine tartar*, and use only white; others esteem the red better, especially for crimsons and all brownish red dyes; and indeed it is very good in all good stuffs, that require a little red, preparatory ground, before they are dyed black.

AMALGAMA is a mass of mercury united and incorporated with some metal.

## A M B

The amalgama of mercury with lead, is a soft friable substance of a silver colour. See *lead*.

By washing and grinding this amalgama with fair, warm water in a glass mortar, the impurities of the metal will mix with the water, and by changing the water and repeating the washing again and again, the metal will be further and further purified.

Dr. *Boerhaave* speaks of amalgamation, as one of the greatest secrets in chymistry, to contrive to bring off the water at last as clear and unfullied as when first pour'd on the amalgama, which might afford a method of making the nobler metals, or procuring them from the baser.

This philosophical way of purifying metals may be apply'd to all metals, except iron and copper.

AMALGAMATION is perform'd by fusing or at least igniting the metal, and in this state adding a proportion of mercury to it; upon which they mutually attract and incorporate with each other.

Gold unites and amalgamates with mercury with the greatest facility, next to that of silver, then lead and tin, and all metals except iron and copper.

The amalgamation of gold is perform'd by heating the *laminæ* or plates of metal red hot, and afterwards pouring quicksilver on them, and then stirring the mixture with a little iron rod till it begins to rise in smoke, this is afterwards poured out into a vessel full of water, where it coagulates and becomes manageable.

This amalgamation or calcination is of great use, not only to goldsmiths; but also to gilders, who by this operation, render gold fluid and ductil for their uses. Such amalgama or mixture being laid on any other metal, as suppose copper, and this afterwards plac'd on the fire to evaporate, the gold will be left alone on the surface of the copper or other metal, and is what we call gilding.

The blackness that adheres to the amalgama may be wash'd away with water, and much of the *mercury* may be squeez'd or press'd out through a linen cloth; the rest being evaporated in a crucible, the gold will remain behind in an impalpable powder.

Gold will retain about three times its own weight of mercury.

This operation is denoted among chymists by the letters A A A.

AMBER, is a yellow, transparent substance, of a gummous and bituminous form and subsistence; but a resinous taste, and a smell like oil of turpentine. It

## A M B

It is chiefly found in the *Baltick* sea; along the coasts of *Prussia*, &c.

Naturalists differ widely in their opinions as to the origin of *Amber*, and as to what class of bodies it belongs. Some supposing it to proceed from vegetables, others from a mineral, and even some from animals.

*Pliny* describes it as a resinous juice oozing from aged pines and firs, others from poplar trees (of which there are whole forests on the coasts of *Sweden*;) and discharg'd thence into the sea; where having undergone some alteration it is thrown in this form upon the shores of *Prussia*, which lie very low.

Some have imagin'd it a concretion of the tears of birds; others the urine of beasts, others the scum of the lake *Cephside* near the *Atlantick*; others a congelation form'd in the *Baltick* sea, and in some fountains, where it is found swimming like pitch.

Others suppose it a bitumen, trickling into the sea from subterraneous sources; there concreted into this form, and thrown ashore by the waves.

This last opinion was for a long time most popular, and seem'd to have the best foundation: but this too is now discarded, as good amber having been found in digging the ground, at a considerable distance from the sea, as that gathered on the coasts.

Others take *Amber* to be a compound substance, and say that *Prussia* and other countries that produce *Amber*, are moistened with a bituminous juice, which mixing with the vitriolick salts abounding in those places, the points of those salts fix its fluidity, whence it congeals; and the result of that congelation makes what we call *Amber*.

The most remarkable property of *Amber*, is that when rubb'd, it draws or attracts other bodies to it, and also, that by friction it is brought to yield *light* pretty copiously. As for the physical uses of *Amber*, it is us'd in making varnishes for several uses.

*To make artificial Amber.* Boil turpentine in an earthen pot, with a little cotton (some add a little oil) stirring it, till it is as thick as paste, then put it into what you please, and set it in the sun for eight days, and it will be clear and hard: of which you may make beads, hafts of knives or the like.

*Another way to counterfeit Amber.* Take the yolks of sixteen eggs; beat them well with a spoon; take gum Arabick twelve ounces, cherry tree gum one ounce, reduce the gums

to



## A M B

to powder, and mix them with the yolks of the eggs; let the gums melt well and put them in a pot well leaded, then set them for six days in the sun, and they will be hard and shine like glass; and when you rub them, they will take up a wheat straw as other *Amber* does.

*Another artificial Amber.* Take whites of eggs; beat them well, then put them into a vessel with strong white wine vinegar, stop it close; let it stand fourteen days, then dry it in the shade and it will be like *Amber*.

*Another artificial Amber.* Break the whites of eggs with a sponge, take off the froth, to the rest put saffron, put all into a glass close stopp'd or into a copper or brazen vessel, set it to boil in a kettle of water, till it be very hard, then take it out and shape it to your liking, lay it in the sun and anoint it often with linseed oil, mix'd with a little saffron; or else being taken out of the kettle, boil it in linseed oil.

*To make yellow Amber soft.* Put yellow *Amber* into hot melted wax well scumm'd, and it will be soft, so that you may make things thereof of what form and fashion you please.

Melt some *turpentine* in a glass in a sand heat, where the fire may be rais'd at discretion, then provide your self with three ounces of *Amber*, either of the whitest or yellowest sort.

If you would have the *Amber* white, pick out the clearest white pieces, or if yellow the clearest of that sort.

*To melt Amber and cast it into any figure, with flies or any small animals in it, as is seen in those valuable pieces of Amber sold at a great price. from Mr. Boyle.*

Levigate your *Amber*, and sprinkle in the powdered *Amber* into the melted *turpentine*, stirring it all the while with a piece of fir-wood, till you find no resistance; then if you find your melting to resist the stick, drop in by degrees a little *Venice Turpentine*, and keep it still stirring, till all the powdered *Amber* is dissolv'd, and is thick enough to pour into moulds; and when it is cold, you will have what figure you propose remain as hard as amber itself, with all the same qualities that amber commonly has.

*An Amber varnish from Mr. Boyle.* Take of white rosin four drams, melt it in a clean glaz'd pipkin, then put into it two ounces of the whitest *Amber* you can get (finely powder'd) by little and little, stirring it with a small stick over a gentle fire, till it dissolves, pouring in now and then a little oil of turpentine; when you find it begin to grow stiff, so continue to do till all the *Amber* is melted.



## A M B

But great care must be taken that you do not set the house on fire, for the very vapours of the oil of turpentine will take fire by heat only; but if it should happen to do so, immediately cover the vessel close with a flat board or a wet blanket, and the air being kept from it, it will go out.

It will be best to melt the rosin in a cylindrical glass in a bed of hot sand, after the glass has been well anneal'd or warm'd by degrees in the sand; under which you must keep a gentle fire.

When the varnish is made, pour it into a coarse linen bag, and press it between two hot boards of oak or iron, and use it with any of your colours, as well as to varnish them over when they are painted.

AMBER-GREASE is a fragrant drug, which melts pretty much like wax; commonly of a grey or ash colour; us'd as a perfume, &c.

Naturalists are of various opinions as to its origin and production,

1. Some suppose it to be the excrement of a bird, which being melted by the heat of the sun, and wash'd off the shore by the waves, is swallow'd by whales, who return it back in the condition in which it is found.

2. Others take it for a kind of wax or gum, which distils from trees, and drops into the sea where it congeals, and becomes *Amber-grease*.

3. Others affirm it to be a vegetable production, issuing out from the root of a tree, whose roots always shoot towards the sea, and discharge them into it.

4. Some suppose it to be a kind of a sea mushroom, which is torn up from the bottom by the violence of tempests; it being observ'd, that *Amber-grease* is seldom found, but after storms.

5. Others take it to be a bituminous matter; which is at first liquid and runs into the sea, and is there condens'd and reduc'd to a mass.

6. Others are of opinion, that *Amber-grease* is form'd from the honey-combs, which fall into the sea from the rocks where the bees had hiv'd or made their nests; which last opinion begins now to be generally allow'd, having something of experience in its favour; several pieces of it having been seen that were half *Amber-grease*, and half plain honey-comb; and large pieces have been found, which when broken, honey-comb and honey too, have been found in the middle.

*Amber-*

## A M E

*Amber-grease* is of considerable use in making perfumes by melting it over a gentle fire, and making extracts, essences and tinctures of it.

*Amber-grease* is often adulterated as follows: They take *Ben nuts* an ounce and half, and pound them to a perfect pulp; and add an ounce and half of *sperma ceti*; beating them well together; then they add *benjamin* in fine powder, *orrice* of *Florence* finely powder'd, and white starch, of each three ounces and a half; bitumen reduc'd to fine powder half an ounce; musk reduc'd to fine powder a quarter of an ounce; *Amber-grease* in fine powder three ounces: these are mix'd together, with a mucilage of gum *tragacanth* made into a mass or paste, and well wrought together with the hand.

*Another way of adulterating Amber-grease.* They take five ounces of the former composition, and six ounces of *Amber-grease*, reduc'd to a fine powder; to which is added a sufficient quantity of damask roses: these are pounded together in a mortar till they are well mixt, and the mass is kept to make perfumes with.

AMBITION is represented in painting by a virgin cloth'd all in green with ivy branches, seeming as about to leap over a craggy rock, on the top of which are scepters and crowns; she is attended by a lion lifting up his head. The ivy denotes *ambition*, always climbing higher and spoiling the walls; the ambitious sparing neither the country, religion, nor counselors, that so he may but only become greater than others; the lion is an emblem of pride.

AMERICA is represented by a woman almost naked with a tann'd or tauny aspect, having a veil folded over her shoulders; round her body an artificial ornament of feathers of divers colours; holding in her hand a bow, and having a quiver on her shoulder or by her side, and at her feet a human head pierc'd with an arrow, and on the ground a lizard.

Naked because the inhabitants are all so; the arms are what both men and women use; the human head intimates that they are cannibals, the lizards are reported to be so large there, as to devour men.

AMETHIST is a precious stone of a violet colour, bordering on purple.

There are three sorts of *Amethysts*; the oriental, which is the hardest, the scarcest and the most valuable, is of a dove colour; the *German* which is of a violet colour, and that of *Carthagena*, which is of the colour of a pansy.

There

## A M M

There are some *Oriental Amethysts* also of a purple colour, and others white and like the diamond.

There are also beautiful ones found in the *Pyreneans*, and the mountains of *Auvergne*.

The *Amethyst* is not extremely hard; but may be cut with a leaden wheel, smear'd with emery moistened with water. It is polish'd on a pewter wheel with *tripoli*.

It is easily engraven on, either in *creux* or *relievo*.

The *Amethyst* according to *Plutarch*, takes its name from its colour, on account of its resemblance of new wine mixt with water; and not from its being a preventative of drunkenness (as the vulgar opinion has been) which gave occasion to its being hung about the necks of great drinkers.

*To make an artificial AMETHYST.* The *Amethyst* being of a violet colour, proceeding from red and blue, must be well imitated to look beautiful.

For this colour take *crystal* frit well made with *tarso* and not sand, this colour requiring no other; to which add, to each pound one ounce of the following powder, which mix well together before they are put into the pot. See *TARSO*.

After this you must set the pot to the fire in the furnace by little and little, otherwise the violence of the powder would cause it to break.

When this glass has been well purified for the space of four days, and it has the colour of an *Amethyst*, you may work it.

This colour may be augmented or diminished by means of the frit or powder, according to the discretion of the workman.

This is the powder which produces the *Amethyst* colour in glass.

Take one pound of *manganese* of *Piedmont* prepar'd (see *manganese*, &c.) and an ounce and half of *zaffer* prepar'd (see *zaffer*, &c.) mix them well together, and put the mass we have shewn to each pound of frit, to have a true *Amethyst* colour.

Or thus; take *sal alkali* three ounces, powder of *crystal* four ounces, filings of *brass* half an ounce, and melt all in a strong fire.

*JOST AMMON* mark'd his pieces with much such a mark as in the plate, No. 7.

*AMMONIACK* as *Gum Ammoniac*, or as it is sometimes, though improperly, call'd *Armoniac*, is a kind of gum brought from the *East Indies*, and is suppos'd to ooze from an umbelliferous plant.

## A N A

*Pliny* calls the tree or plant whence it flows *Metopion*, and says, the gum takes its name from the temple of *Jupiter Ammon*, nigh which the tree grows.

*Dioscorides* says 'tis the juice of a plant, a kind of *ferula* that grows in *Barbary*; and that the plant which produces it, is call'd *agasyllis*.

In the choice of *Ammoniack*, chuse that which is of a high colour, and not mixt with any scrapings of wood, stone or sand; which is call'd *θραῦσμα*, *i. e.* fraiture: the other which is full of stones or sand is call'd *φύσσωμα*, *i. e.* mixture.

*Sal* AMMONIAC is a kind of salt more usually written *Armoniac*.

ANAMORPHOSIS in perspective and painting, a monstrous projection; or a representation of some image, either on a plane or curve surface, deform'd; which at a certain distance shall appear regular, and in proportion.

To make an *Anamorphosis* or monstrous projection on a plane.

Draw the square *A B C D* of a bigness at pleasure, and subdivide it into a number of lesser squares. See the figure.

This square or reticle is call'd the *craticular prototype*. In this draw the image that is to be rendred distorted and monstrous.

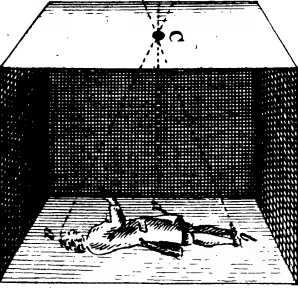
Then draw the line  $ab \equiv AB$ ; and divide it into the same number of equal parts, as the side of the prototype *AB*; and erect the perpendicular *EV* in the middle of it, so much the longer; and draw *VS* perpendicular to *EV*; so much the shorter; as you would have the image be distorted.

From each of these divisions draw right lines to *V*, and join the points *a* and *S*, as also the right line *aS*, through the points *d, e, f, g*, draw lines parallel to *ab*, then will *abcd* be the space that the monstrous projection is to be delineated in, which is call'd the *craticular ectype*. See the figures.

Lastly, in every small trapezium or squarish figure of the space *abcd*, draw what appears delineated in the correspondent trapezium of the square *ABCD*.

By this means you will attain a deformed image, which yet will appear in just proportion to an eye distant from it, the length *FV*, and rais'd above its height *VS*. It will be diverting to manage it so, that the deformed image do not represent a mere chaos; but some other image: thus it has been contriv'd, that a river with soldiers, waggons, &c. marching along the side of it; has been so drawn, that when view'd by an eye in the point *S*, it appear'd to be the satyrical face of a man.

An



*Camera Obscura* Fig. 2.

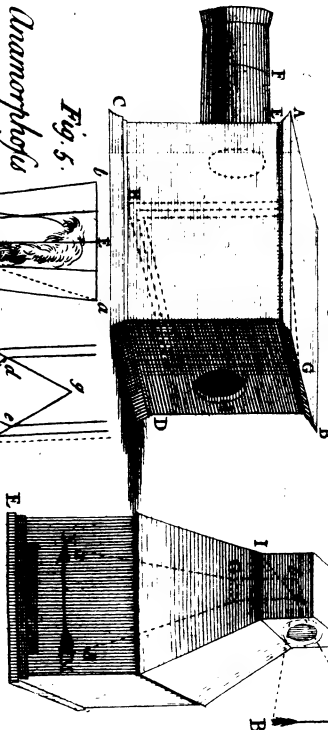
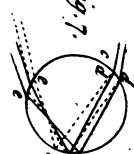


Fig. 3



*Fig. 5.*  
*camorthosus*

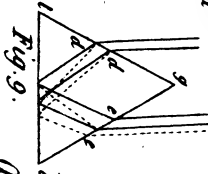
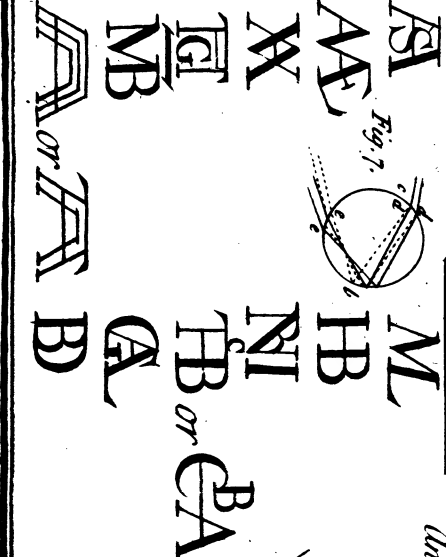
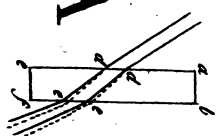


Fig. 9

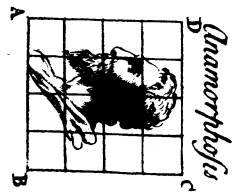


Fig. 4



An image also may be distorted mechanically ; by perforating it here and there with a needle, and placing it against a candle or lamp ; and observing where the rays which pass through these little holes fall on a plane or curve superficies ; for they will give the correspondent points of the image deform'd ; by means of which, the deformation may be completed. See the plate.

HENRY ANDERSON was a face painter, and a disciple of *Streater* in great esteem about the year 1660, which he did not long survive ; he drew the beautiful duchess of *Richmond*, which recommended him to draw king *Charles II.* and most of his court. He interfer'd in his business with Sir *Peter Lely*, and had great share of reputation in those times ; he was likewise a landskip painter, and in still life ; as also a good imitator of his master *Serjeant Streater*, till he left his way and fell to face painting.

ANDREW ANDREANI of *Mantua*, he made use of the two marks on the plate No. 8, 9 ; he engrav'd on wood *a tre tagli* or the crossings in his shades, the second mark is found in the crossings of *Julius Cæsar*, in ten sheets engrav'd in 1699, and was invented by *Andrew Mantegna*, who also engrav'd on copper.

ANEMONIES [the way of painting them in miniature] of this flower there are many sorts as well double as single, which last are commonly plain, and are either purple with purple and white, shaded with the same colour, some bluer some redder, sometimes very pale, and sometimes very deep.

Others are coloured with *lake* and *white*, and finish'd with the same, by diminishing the white or even using none at all.

Others again are coloured with *vermilion*, and shaded with the same colour, and deepened with *carmine*.

Others are white and lemon colour. These last are done with masticote, and both the one and the other must be shaded and finish'd, sometimes with *vermilion*, and sometimes with a very deep *lake*, especially at the bottom of the cup about the seed, which is also often of a *blackish* colour, which is imitated with *indigo* or with *black* and *blue*, mingling in some a little *bistre*, and working continually with fine strokes, and scumbling the shades into the lights.

There are some, that have the bottom of the cup much brighter than the rest, and even so as to be quite white altho' the rest of the Anemony be deep.

The seed of all these Anemonies is imitated with *indigo* and *black*, with a very little white; sometimes it must be heightened with *masticote*.

DOUBLE ANEMONIES are of very various colours; but the finest of them have their largest leaves strip'd.

Some of these stripes are perform'd with *vermilion*, to which is added *carmine* to finish them, shading the rest of the leaves with *indigo*.

For the smaller leaves within lay on a mixture of *vermilion* and *white*, and shade with *vermilion* mix'd with *carmine*, and here and there be very strong, particularly in the heart or cabbage, near the great leaves on the shady side, and finish with hair strokes of *carmine*, which must humour the stripes and turn of the leaves.

The stripes of others are coloured and finish'd with *carmine* only, as well as the inner or smaller leaves; but yet observing to leave a little round in the midst of these last, where a deep *purple* or *violet* must be laid, which must be scumbled into the rest; and the whole being finish'd, lay on broad strokes of this same colour around the smaller leaves, especially on the dark side, and scumble them into the greater, which must for the rest be shaded with *indigo* and *black*.

In some others, the smaller leaves are of *lake* or *purple*, although the stripes of the greater are *carmine*.

There are others whose stripes are *carmine* in the middle of most of the large leaves, with *vermilion* under it in some places, all which must be scumbled into the shades of the ground, which are of *indigo* and *white*.

The smaller leaves are laid in with *masticote*, and are shaded with a very deep *carmine* on the light side, leaving here the *masticote* almost to itself, and only dividing the leaves with a fine touching of *orpiment* and *carmine*, which smaller leaves may be sometimes shaded with a very little pale green.

There are *double Anemonies* all red, and of a violet colour; the first are coloured with *vermilion* and *carmine*, with scarce any white, and are shaded with *carmine* alone, well gummed, that they may be very deep; *purple Anemonies* are imitated with *purple* and *white*, and are finish'd without *white*.

In short, there are of all colours of these *double Anemonies*, as well as of the *single*, which are to be painted by the rules here suggested.

The *green* of both the one and the other must be *verditer*, mixt with *masticote* for the dead colouring, and it must be finish'd with bladder *green*.

Their



## A D M

Their *stalks* incline to be a little reddish ; therefore they are to be shaded with *carmine*, and sometimes with *green* after they are laid in with *masticote*.

FILIPPO ANGELI call'd NAPOLITANI, imitated *Michael Angelo Caravaggio*, liv'd at *Rome*, *Naples* and *Venice*, excell'd in battles and landscapes, died in the year 1609 aged forty years.

*Philippo d'* ANGELO, a *Roman* born in the year 1570. He practis'd for the most part in battles and landscapes, died at *Venice* Anno Ætat. 40.

*Michael* ANGELO PACE, born 1610, and call'd *Campidoglio*, was a disciple of *Fioravanti*, and very much esteem'd all over *Italy*, for his admirable talent in painting fruit and still life. He died at *Rome* anno 1670, leaving behind him two sons, of whom *Gio Battista* was brought up to history painting under *Francesco Mola*.

MICHAEL ANGELO BUANOROTI of noble descent, born in the year 1474, scholar of *Dominico Ghirlandajo*, liv'd at *Florence* and *Rome*, excell'd in history painting, sculpture and architecture, died in the year 1564, aged ninety years.

MICHAEL ANGELO CERQUOZZI call'd DALLE BATTAGLIE, born in 1600, scholar of *Antonio Salvatti a Bolognese*, liv'd at *Rome*, excellent for battles and fruit, died in the year 1660, aged sixty years.

The passion of ADMIRATION says *M. Le Brun*, is a surprize which makes the mind consider with attention, those objects which seem rare or extraordinary.

It is observ'd, that admiration causes no change in the heart nor in the blood, as the other passions do ; the reason of which is, that having neither good nor ill for its object, but only to know the thing one admires, it has no relation to the heart or blood, on which depends all the welfare of the body.

Admiration is the first and most temperate of all the passions, wherein the heart feels the least disturbance ; and therefore the face receives little alteration thereby ; and if any, it will only be the raising of the eye-brows ; the ends thereof being yet parallel ; the eye will be a little more open than ordinary, the ball and even the lids without motion being fix'd on the object, which causes the admiration.

The mouth will be open ; but will appear without alteration, any more than the other part of the face.

This passion produces only a suspension of motion, to give time to deliberate what she has to do, and to consider atten-

## A N G

tively the object before her ; if that be rare and extraordinary, out of this first and simple motion of admiration is engendred *esteem*. How this passion is represented in drawing. See the plate at the end of letter A.

ANGER says M. *Le Brun*, is a turbulent agitation excited in the appetite by grief and boldness ; by which the soul is retir'd into itself, to avoid the injury receiv'd, and at the same time is rais'd against the cause of the injury, to be reveng'd of it.

When anger siezes on the soul, he who feels this passion, hath his eyes red and inflamed ; his eye-balls wandring and sparkling ; his eye-brows sometimes drawn down, and sometimes rais'd up one against another ; the forehead, will appear deeply furrowed ; and with wrinkles between the eyes ; the nostrils will appear opened and widened ; the lips press'd one against the other ; and the under lip surmounting the upper, leaving the corners of the mouth a little open, forming a kind of cruel and disdainful grin.

He will seem to grind his teeth and to foam at the mouth, his face will be in some places pale, and in others red and swell'd ; the veins of the forehead the temples and the neck, will be strained and puffed up, the hair standing upright ; and he who is possess'd with this passion, is swell'd and puffed up by a stoppage of the breath ; the heart being oppress'd by a great quantity of blood, which retires thither, as it were to its succour.

In anger, all the motions are very great and violent, and all the parts agitated ; the muscles must be very apparent, bigger and more swell'd then ordinary, and the veins and nerves strained.

How anger is represented in drawing and painting, see the figures in the plate at the end of letter A.

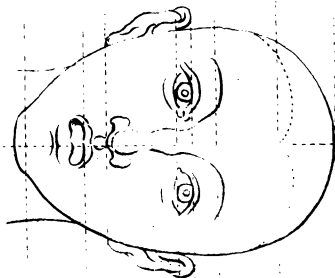
To *anger* sometimes succeed rage and despair.

ANGER is represented in painting by a young man, round shoulder'd, his face bloated, sparkling eyes, a round brow, a sharp nose, wide nostrils ; he is clad all in red, his crest is a boar's head ; from which issues fire and smoke ; he holds in one hand a drawn sword ; and in the other a lighted torch.

He is represented young ; because youth is prone to *Anger*. The boar is an animal much inclin'd to wrath ; the sword shews, that *Anger* presently lays *hold* of it ; the cheeks pufft and bloated intimate, that *Anger* often *alters* the face, by the boiling of the blood ; and *inflames* the eyes.

GUM

Admiration.



Admiration.



Anger.



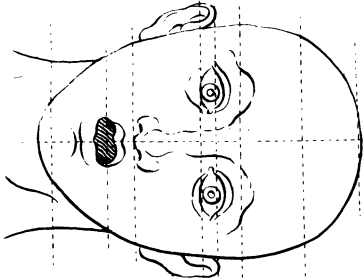
Anger.



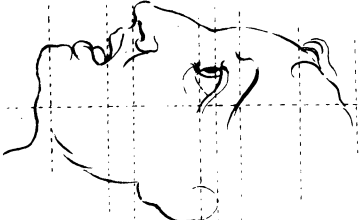
Attention.



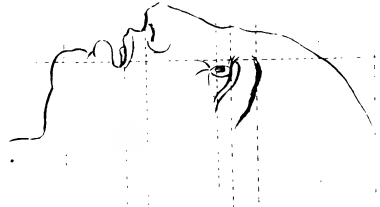
Discontent.



Discontent.



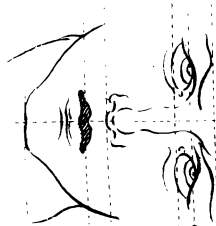
Admiration.



Anger.



Attention.





## A N T

**GUM ANIMÆ**, } a kind of gum or rosin, of which there  
**GUM ANIMI**, } are two sorts, the oriental and occidental. The *oriental Gum Animæ*, is distinguished into three sorts; the first is white, the second blackish; in some respects like myrrh; the third pale, resinous and dry.

The *occidental* flows from an incision in a tree growing in *New-Spain*, call'd there *Courbati*; it is transparent, and of a colour like to that of frankincense. Its smell is very agreeable, and it easily consumes in the fire: all the several kinds are us'd in perfumes by reason of their charming smell; but *bdellium* is frequently sold instead of it.

**ANNEALING**, commonly call'd *Nealing*, is a term us'd for the preparing of several matters, by heating or baking them in an oven or the like.

*Annealing of glass*, is the baking of it, to dry, harden and give it the due consistence, after it has been blown and fashion'd into the proper works.

This is usually perform'd in a kind of tower, call'd the *Leer*, built over the melting furnace *Annealing* or *Nealing* of glass, is commonly us'd for the staining of glass with metal colours.

*Annealing of steel*, is the heating it in the fire to a blood red heat; and then taking it out, and letting it cool gently of itself.

This is done to make it softer, in order to engrave or punch upon it.

**ANTICKS** } (of *Antes*, L.) are buttresses, &c. the form

**ANTIQUES** } of them (is only for delight's sake) a general or irregular composition of men, beasts, birds, fishes, flowers and such like, without either rule or reason; this must be a continuation of one and the same work, through the whole piece without change or alteration.

*As if it be naked boys playing, lying, sitting or riding upon goats, eagles, dolphins and the like; strings of pearls, satyrs, tritons, apes, dogs, oxen, bearing or drawing fruits, branches or any wild fancy after your own invention, with a thousand such other idle toys; be sure you observe the continuation.*

**ANTIQUE**, ancient, the term is chiefly us'd by sculptors, painters and architects, who apply it to such pieces of sculpture, painting and architecture, &c. as were made at the time, when the arts were in their greatest perfection, among the ancient *Greeks* and *Romans*, viz. from the age of *Alexander the Great*, to the time of the Emperor *Phocas*, when *Italy* became over-run by the *Goths* and *Vandals*. In this sense the word, is the contrary of modern. Thus

we say, the *Antique manner*, the *Antique taste*, an *Antique bust*, &c.

ANTIQUÉ, is sometimes even contradistinguished from ancient, which denotes a lesser degree of *antiquity*, when the art was not in its utmost purity.

ANTIMONY, is a mineral substance of a metalline nature; having all the seeming characters of a real metal, except malleability.

It is properly call'd a *semi-metal*; it being a fossile glebe compos'd of some undetermin'd metal, combin'd with a sulphureous and stony substance.

*Antimony*, is found in mines of all metals; but chiefly in those of *silver* and *lead*; but that found in *gold* mines, is usually esteem'd the best. There are also particular mines of it, as those in *Hungary*, *Transylvania*, *Germany*, and in several provinces of *France*.

It is found in clods or stones of several sizes, bearing a near resemblance to *black lead*; except that it is lighter and harder: and thence it is call'd *marcasite of lead*; and its metalline part is suppos'd to be of that species.

*Antimony*, has something particular in its texture, being full of little shining veins or threads, like needles, brittle as glass. Sometimes it has veins of a red or golden colour intermix'd, which is call'd *Male-Antimony*; as that which has not these specks is call'd *Female*.

It will fuse in the fire, though not without some difficulty, and dissolves more easily in water.

After it has been dug out of the earth, it is put into large crucibles, and fus'd with a violent fire; and afterwards poured into cones or antimonial horns; which is the common or crude *Antimony* of the shops; the *apex* of which is always the best and purest part; as the basis or broadest part is the foulest.

The uses of *Antimony* are numerous and important. It is mingled with *tin* to make it white and harder; and with *bell metal* to render the sound more clear; and is a common ingredient in specula or burning concaves, serving to give them a finer polish. It is a general assistant in melting of metals.

A. P. M. A. signifies *Abas Primaticcius, inv. Marc Anthony, exc.* this mark is found in a plate representing a shepherd lying under a tree; and another holding his hand on an universal planisphere.

APPARENT Magnitude of an object, is the Magnitude thereof, such as it appears to the eye.

## A P E

The *Apparent* or seeming Magnitude, is measur'd by the optic angle.

The *Apparent* or seeming Magnitude of an object, is said to be so many degrees as the optic or visual angle subtends.

The *Apparent* Magnitudes of distant objects, are usually said to be as their distances, reciprocally.

The APPARENT Place of any object in *opticks*, is that wherein it appears, when seen through one or more glasses; the *Apparent Place*, is different from the real one; for when by refraction through glasses, that parcel of rays which falls on the pupil of the eye, from each point of any near object, is made to flow as close together as that which comes from a distant one; or when by the same means, the rays coming from distant objects are made to diverge as much as if they flow'd from near ones; then the eye must necessarily see the place of the object chang'd, which change is its *Apparent Place*.

If an object be plac'd nearer to a convex glass, than is the distance of its focus: its *Apparent Place* may be determin'd; but if the object be in the focus of the glass, the *Apparent Place* of the object cannot be determin'd, only that it will appear vastly remote.

Nor can the *Apparent Place* be determin'd, if the object be beyond the focus of a convex glass; but if the object be further distant from a convex glass than its focus, and the eye lie beyond the distinct base; its *Apparent Place* will be in the distinct base.

APPEARANCE, [in *perspective*] is the representation or projection of a figure, body or the like object upon the perspective plane.

The *Appearance* of an objective right line, is always a right line.

Direct APPEARANCE, [in *opticks*] is the view or sight of an object by direct rays; without either refraction or reflection.

APELLES, *Pliny* speaking of the growth and perfection of the art of PAINTING, referring particularly to *Apelles*, tells us, as a preliminary to this account, that he surpass'd all that ever went before him, or came after him; & *nemo postea inventus est qui artem ultra provexerit*.

He was born in the 112 *Olympiad*, after the building of Rome 420 years, and 324 before *Christ*.

*Strabo*, says he, was born in *Ephesus*, where he put himself apprentice to *Pamphilus*.

## A Q U

APOLLO, is represented as a young man, without a beard, and rays of light about his head, having in one hand a harp, and the three graces, and in the other a shield and arrows..

He is also represented with long curl'd hair, crown'd with laurel in a purple robe, holding a silver bow in his hand, and plac'd on a throne of emeralds.

He was one of the most genteel of the Heathen Gods, of whom they do not relate such filthy stories, as of the others. They made him the God of wisdom, physick, musick and learning.

APPREHENSION, is represented in painting by a young lady of a middle stature, cloth'd all in white; brisk and active, dispos'd to listen to another speaking; having in one hand a cameleon, and in the other a mirrour.

Her youth denotes her *aptness* to apprehend and learn; the same is intimated by her middle stature: for the upper rooms are always worst furnish'd, is usual spoken of a very tall person. Her white clothing, is because white is the *ground* of all colours; she being on tiptoe, shews her being in readiness to learn and understand; the glass intimates, that she imprints things on herself, and makes all she *hears* and *sees* her own.

APRIL, is represented like a young man in green, adorn'd with a garland of myrtle, and hawthorn buds; wing'd, holding in one hand primroses and violets, and in the other the zodiack sign taurus.

AQUA FORTIS, is a corrosive liquor, us'd as a menstruum for dissolving silver and all other metals, except gold.

*Aqua Fortis*, is one of the ingredients in *salt-petre*, which is the only salt that will act on silver.

In preparing *Aqua Fortis*, either *sand* or *allum* or *vitriol* is mix'd, or the the two last together with *salt-petre*, and then distill'd by a violent fire, and the fumes being caught, condensing in the receiver, become the *Aqua Fortis*.

If some of these matters are not added to the *nitre*, it will run too readily, and so prevent the evaporation; but the fusion being prevented, the parts of the salt receiving more violent impressions from the fire, are converted into a volatile spirit.

Hence to try whether or no, *Aqua Fortis* be pure; put a grain of a solution of *silver* in *Aqua Fortis* into a like quantity of the water, and if the solution remains without either the water's turning milky, or the silver precipitating, the *Aqua Fortis* is pure.



## A Q U

Dyers use it in dying scarlet, &c. refiners for parting or separating silver from gold or copper.

Also for colouring of bone, ivory, &c. which is done by steeping the things therein; after they have been first ting'd with *copperas* or *verdegrease*.

Some also turn it into *aqua regia*, by dissolving in it a fourth part of its weight of *sal armoniac*, and then stain therewith ivory hafts and bones of a fine purple colour.

Book-binders also throw it on leather, and so marble the covers of books.

Diamond cutters also use it to separate diamonds from metalline powders.

It is also us'd in etching on copper or brass plates.

Mr. *Boyle* tells us, he has caus'd canes to be stain'd like tortoise shell, by laying on them a mixture of it with oil of *vitriol* several times, over live coals, to cause it to penetrate the deeper, and afterwards giving them a gloss with a little soft wax and a dry cloth.

*Aqua Fortis*, this liquor is of various and extensive use to the workers in mosaic, for staining and colouring their woods.

**AQUA FORTIS**, take distill'd white wine vinegar three pints, *sal armoniac*, and *bay salt*, of each six ounces; *verdegrease* four ounces; put all together into a large well glaz'd earthen pot (that they may not boil over) cover the pot close and set it over a quick fire; and cause it speedily to boil two or three great waulms and no more: then uncover the pot, and stir it sometimes with a stick, taking heed that it boil not over; having boil'd, take it from the fire, and let it cool, being close cover'd; and when it is cold, put it into a glass bottle with a glass stopple. If this should be too strong in etching, weaken it with a glass or two of the same vinegar of which you made it; the common *Aqua Fortis* is exhibited in the *Pharmacopea Londinensis*; and *Doron Medicum*, thus;

Take dry'd *vitriol* two pound, *salt-petre* one pound, mix them and distil by a retort, in open fire by degrees.

**AQUA FORTIS** which will dissolve silver and quick-silver; there are several sorts of *Aqua Fortis*, prepared after different manners, appropriated to the different uses they are design'd for; but all of them always with *salt-petre* or *nitre*, which is the principal ingredient in *Aqua Fortis*.

This which follows, is one of those that has a peculiar composition.

Take one pound of *nitre* or *salt-petre* refin'd, three pound of *rock allum*, calcin'd on the fire-shovel; and four ounces of

## A Q U

*crystalline arsenick* ; reduce all into a fine powder, to which add seven ounces of fine sand (but *Neri* says *lime*) and having well mixt the whole composition, put it into a glass cucurbit, always leaving  $\frac{1}{3}$  part of it empty ;  $\frac{2}{3}$  being fill'd, lute the cucurbit well with a strong lute, which is to be made as follows.

Take one part of loam (a fat earth) which is found in rivers, three parts of sand, of common wood ashes well sifted, of the shearings of woollen cloth, each half a pound, mix the whole well together, and putting water to them, make a soft paste ; to which add one third part of common salt powder'd, and work them all well together, and then use them in luting your vessels.

But before you put the cucurbit or body on, you must lay sand four inches deep, and thick iron bars to bear the weight, then fit a head, and lute the joints well with a lute made of fine flour, and lime powder'd and mixt with whites of eggs: then put on the joints, rollers of fine linen, then lute it again, and put on linen rollers again three or four times, each time letting it dry before you put on the next roller, and then this will bear the violence of the fire, and the penetrating force of the spirits of the *Aqua Fortis*.

After that, you must put this body of the *alembick* in a deep earthen pan, made of the same earth as *crucibles*, fill'd with sand, so that it be buried in the sand, within two inches of the joints ; then set it in a wind furnace fit and capable to maintain an equal fire. See the article FURNACE.

Your *alembick* being thus fitted, you must put to the head a glass receiver very capacious, the better to resist the force of the spirits, otherwise all may break.

Lute it well to the mouth of the *alembick*, as you did the joints before, and with the same precaution of letting it dry each time in the air, taking care not to kindle the fire in the furnace, till the lute of all the joints be dry ; for that is very necessary.

The whole being thus in right order, kindle a small-coal fire for the space of three hours, during which time, the windy humour, that is in the materials, and which would break them, will be drawn off into the receiver.

So continue a moderate fire for six hours, then increase it little by little, putting in at last billets of dry oaken wood to the coals for six hours more, till the *alembick* or head begin to be ting'd yellow, and the spirits begin to rise.

Observe to continue this regimen or degree of fire, till the head and receiver begin to grow red ; then augment it till the  
*alembick*

## A Q U

*alembick* becomes of a deep red; continue this degree of the fire, as long as that colour lasts, till all the spirits are drawn off, and the head and receiver begin by degrees to grow clear, and re-assume their common colour in cooling; which sometimes will be two days first.

Notwithstanding you must continue the fire two days afterwards, then let the furnace cool of itself; taking care, that while the *alembick* and receiver are still red and the fire in force, that you admit no cool air into the place, and that nothing cold touch them, which would break them.

When all is cold, cover the head and receiver with wet linen, (that the spirits which are about the head and receiver) may the better sink to the bottom of the receiver, and let it stand so for twelve hours.

Then bathe the joints, and the luting with warm water in order the better to loosen the bandage, and so take off the head from the receiver, otherwise it would be difficult to do it; then you may break the body which will be good for nothing, and take out the *fæces*, which reduce again to powder.

Add to each pound of that powder four ounces of refin'd *nitre*, and put the whole into a cucurbit (or body) on which pour all the *Aqua Fortis*, before distill'd; then put on the head and receiver, and lute it and dry it well as you did before, having put it on the same sand furnace; during the first four hours make a gentle fire, which afterwards may be increas'd by little and little, till the head and receiver begin to grow clear, and all the spirit is drawn over.

After which let all cool, covering the head and receiver with wet cloths, and let it stand twelve hours as before. Then unlute the joints again with warm water, and put the *Aqua Fortis* into glass vessels well stoppt, that the spirits may not exhale, and keep it for the uses hereafter mention'd.

This is the *Aqua Fortis* call'd water of separation, and the best that can be made.

There are some, who instead of *roche allum* take the best *Roman vitriol* or the like.

You may know whether the *vitriol* be proper for this use or not, by rubbing it on a piece of well polish'd iron, if it be, it will leave a copper colour on it, then this *vitriol* will make an *Aqua Fortis* far more penetrating than the former. See the purification of this *vitriol* under the article VITRIOL.

## A Q U

**AQUA MARINA**, a gem or precious stone of a sea green colour. It is found along the coasts, and is said to vie with the *amethyst* in hardness.

Some criticks have contended for its being the sixth stone in the rationale of the *Jewish* high Priest; call'd in the *Hebrew*, *tharsis*, which has been render'd in the *Latin*, *berillus*, and by others *chrysolithus*; several lapidaries take it for the *beril*.

**AQUA MERCURII**, *to make*. Take putty or tin calcin'd very fine and pure, one ounce, quicksilver purified, two ounces, mix them and make an amalgama: wash this with fair water till it comes off clear and colourless; then dry it perfectly, put it into a matrafs, with such a degree of heat as is necessary for sublimation: when it has been sublim'd and is grown cold, take out the sublimate; to which add an ounce of *Venetian* corrosive sublimate; grind them well together on a porphyry, then put them into another matrafs, close it very well, and sink it all over in a vessel of water, so in a short time the whole mass will be resolv'd into water: filter this into a glass receiver, and coagulate on a gentle sand heat to a crystalline substance; reduce this in a mortar to a very fine powder, and searce it through a fine sieve, put it into a matrafs, stop it well, and digest in *balneo mariæ*, to be resolv'd into water, which keep for use, in making artificial pearls, &c.

**AQUA REGALIS**, } is nothing but a common *aqua fortis*  
**AQUA REGIA**, } *tis*, wherein one fourth of its weight  
of *sal-armoniac* has been dissolv'd.

But in order to have a good and strong *Aqua Regalis*, you must take one pound of *aqua fortis*, prepar'd as directed, and put it into a glass matrafs; and add to it only two ounces of *sal-armoniac*, then set the matrafs into a warm bath, or pan of warm water, and stir it often, that the *sal-armoniac* may be well dissolved in the *aqua fortis*; which will be ting'd of a yellow colour.

Then you must add as much *sal-armoniac* to it, as the *aqua fortis* can dissolve, then let it settle a little; and the *sal-armoniac* will leave at the bottom all its terrestreity or earthy part.

After that decant it gently off into another vessel, so as not to disturb the settling at the bottom, or rather filtre it through whited brown paper.

This water will dissolve gold and other metals, far better than the common *Aqua Regalis*, except silver, which it toucheth not at all, for reasons, which chymists are acquainted with.

**AQUA**

## A Q U

**AQUA REGALIS**, } far stronger than the former. This  
**AQUA REGIA**, } is what some philosophers call the  
 water of the two champions, and is made with two parts  
 of purified *sulfur*, two parts of purified *sal-armoniac*, and  
 one part of calcin'd flints, all reduc'd to powder and mixt  
 together.

Then take an earthen retort, which must have a little hole  
 on the back (or curvature) on the upper side, through which  
 you may put in the ingredients.

For the greater safety, you may lute the body of the re-  
 tort over well, and let it dry; then put it in the furnace, and  
 fit to it a large glass recipient (by reason of the violence of the  
 spirits) wherein you may put a little water to attract them;  
 lute the joints of them as you do for *aqua fortis*, and let them  
 be well dry'd before you kindle the fire, for the reasons else-  
 where assign'd.

The lute being dry, and all in right order, you must begin  
 with a gentle fire, that the retort may grow warm by degrees,  
 and afterwards gradually increase it, till it grow red hot.

Then put in at the hole of the retort, four ounces at a time  
 of the ingredients you have prepar'd, and stop it again pre-  
 sently.

Doing thus, you will see in a little time great quantities  
 of cloudy vapours arise, and pass into the receiver and fill it,  
 which will dissolve by little and little; mixing themselves with  
 the common water, and the receiver will grow clear.

As soon as you perceive this, you must put four ounces  
 more of your ingredients into the retort, and give time for  
 the vapours (arising again) to dissolve as before; then reiterate  
 this process, till all your ingredients are distill'd off.

Then unlute the receiver, and pour the liquor into an *alem-  
 bick*, and draw off the phlegm in *balneo mariæ*, and rectify it  
 in an ash-fire; then the water will be made, and fit to dis-  
 solve any metal but silver.

**AQUA REGALIS**, made another way more easily, and  
 with less precaution.

Take one pound of good *salt-petre*, reduce it to powder,  
 and mix it with three pound of potters clay, or flints calcin'd  
 to powder; put the whole into a glass retort well luted, and  
 fit to it a receiver, lute the joints well, then put it in a rever-  
 beratory furnace, and distil it according to art in a gradual  
 fire.

When all the red spirits are pass'd over, as we have ex-  
 plain'd in speaking of *aqua fortis*. Then draw off the phlegm  
in

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in *balneo mariæ*, then rectify it in an ash furnace, and keep it for use.

Then take a pound of *sal-armoniac* well powder'd, and mix it with four pounds of wood ashes (out of which you have before extracted all the salt with warm water) then put the whole into a retort, fit a receiver to it, and distil it in a sand furnace, and the spirit of *sal-armoniac* will pass over into the receiver.

Then unlute the receiver, and take off that phlegm of the spirit in *balneo mariæ*, and rectify it in ashes.

Having done this, take of each of these spirits, and then mix them together, and distill them in an ash furnace; then will you have a strong menstruum for dissolving gold.

It is to be noted, that the spirit of sea water salt, distill'd as *salt-petre*, has the same effects as the water of the two *champions*, the preparation of which has been given before, and as that which has been now treated of; and besides it is not so sharp or corrosive.

You must, if you would make it successfully, take three parts of spirits of sea water salt, and add to it one part of *salt-petre*, then distil it together in an ash furnace, the better to unite them.

Then will you have an *Aqua Regalis*, which will dissolve gold sooner than the spirit of *sal-armoniac*, and which will make it rise and pass over in the receiver.

*Gum ARABICK*, is the name of a gum which distils from a species of *Acacia*, growing in *Arabia* and *Egypt*.

It is very common among us, but little is to be met with that is genuine; it is suspected to be adulterated with our common plumb-tree gums.

That is accounted the best, which is in smallest pieces, and almost of a white colour.

**ARCHITECTURE**, is represented in painting and sculpture, by a woman sitting upon a piece of a pillar, having all sorts of tools and instruments about her, looking earnestly upon a draught or design which lies in her lap; behind her a person representing reason, looking likewise upon the draught, on her head a helmet, in her left hand *Pallas's* shield, and in her right hand *Mercury's* caduceus.

*ARCHITECTURE Military*, is represented in painting, &c. as a woman of ripe years, in a noble garment of divers colours, a gold chain about her neck, with a diamond in one hand, the mariners compass in the other, the description of an hexagon fortification, a swallow on her fist, a pick-ax and spade

## A R M

spade at her feet. Her party-colour'd vestments denote the understanding of divers contrivances in this art; the golden chain and diamond denote durability and excellency; for fortifications are the best jewels of princes, securing them from enemies; the swallow is remarkable for the artificial building her nest.

ARDICES the *Corinthian*, and TELEPHANES of *Sicyon*, or CRATO of the same city were the persons, who made the first steps towards the advancement of *Painting*.

These began to add other lines (by way of shadowing) to their figures, which gave them an appearance of roundness and much more strength. This manner was call'd GRAPHICE, but the advantages it brought to its inventors were so inconsiderable, that they still found it necessary to write under every individual peice, the name of whatever it was design'd to represent, lest otherwise the spectators should never be able of themselves to make the discovery.

ARGENTUM MUSICUM,  $\zeta$  a kind of liquid silver to  
 ARGENTUM MUSIVUM,  $\S$  write with; take one ounce of tin, melt it, and put thereto *tartar* and *quicksilver* of each one ounce, stir them well together until they are cold, then pound them in a mortar, and grind it with a stone and muller; mix it with gum water, and you may write therewith, and afterwards polish it.

ARISTOCRACY, is represented in painting as a lady in the prime of her years, attir'd in a splendid habit, sitting majestically in a chair of state, a crown of gold on her head, holding in her right hand a bundle of rods bound together, and a garland of laurel, and in her left, a head piece; on her right side is a bason and a purse full of gold and precious jewels, and on her left hand an ax.

ARITHMETICK, is painted in cloth of gold or otherwise, as a lady in garments of different colours, besprinkled with musical notes, and in the skirts is written *par* and *impar*, even and odd, in her left hand the numeration table.

Her handsomness denotes the beauty of all things in number, weight and measure, her perfect age shews the perfection of this Art, the various colours shews, that she gives principles to all parts of the mathematicks.

ARMENUS *Bolus*, i. e. Bole ARMONIAC or *ammoniac*, a kind of earth brought from *Armenia*. It is of a pale red colour, and partakes much of the nature of stone; but is soft, fat, friable, easily pulveriz'd, and sticks to the tongue.

This



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This *Bole* is easily falsified, and the merchants frequently sell *Lemnian earth* instead of it.

*Matthiolus*, says it is found in gold, silver and copper mines.

ARMONIACK,  $\gamma$  is a sort of volatile salt, of which there  
AMMONIACK,  $\delta$  are two kinds, ancient and modern.

The ancient *Sal Armoniack* call'd also *Sal Cyreniack*, describ'd by *Pliny* and *Dioscorides*, was a native salt, generated in the earth, or rather the sands in those large inns or caravansera's, where the crowds of pilgrims, coming from all parts to the temple of *Jupiter Ammon*, were wont to lodge. The way of conveyance being in those parts commonly by camels, and those creatures, when in *Cyrene*, a province of *Egypt*, wherein that celebrated temple stood, urining in the stables, or, as some say, in the parch'd sands: of this urine, which is remarkably strong, sublimed by the heat of the sun, arose a kind of salt, sometimes call'd *Ammoniack*, and sometimes *Cyreniack* from the region.

This salt being no longer found in these parts, some authors suspect there never was any such thing; and that the ancient as well as the modern *Sal Armoniac* was factitious.

The reason that no more is produc'd in *Egypt*, is because the pilgrimages to the idol of *Jupiter Ammon*, have long since been laid aside.

The characters of *Sal Armoniack* are, that it cools water, turns *aqua fortis* into *aqua regia*, and consequently dissolves gold; that it sublimes by a large fire and affords a pungent urinous savour.

The modern *Sal Armoniack* call'd also *Aqua Cælestis*, is held by some to be native, and to trickle out of the ground about mount *Vesuvius* and *Ætna*, &c. in form of a liquor, which when filtred and inspissated, becomes *Sal Armoniack*.

But this is certain, that all the modern *Sal Armoniac* is compound and factitious.

The publick has been for a long time at a loss, both as to the place from whence it comes, and how it was made, all that was known for certain, was, that it came from the *Levant*.

But *Sicard* the jesuit, says, it is made in *Egypt* in a sort of ovens, contriv'd for the purpose, the tops of which are perforated with several longitudinal clefts; and on these clefts are laid several long neck'd glass bottles, fill'd with foot, a little sea salt and the urine of cattle, well stopp'd.

These are cover'd up with a body of clay and brick, all but the necks, which lie open to the air; and then the fire being



being put into the oven, it is kept up for three days and three nights successively.

The phlegm of the materials contain'd in the bottles, being thus exhal'd by the heat of the fire; and the acids and alkaline salts abounding therein, being thus brought together near the necks of the bottles, they coalesce, harden and form a whiteish mass, which is the *Sal Ammoniack*.

Our chymists have divers ways of preparing a *Sal Armoniack* in imitation of this; but this is to be observ'd, that all foot is not fit for the purpose; but only that exhaling from a sort of fuel made of dung.

The common way is by putting one part of common salt, to five of urine; to which some add half that quantity of foot, the whole being put in a vessel, they raise from it by calcination a white friable farinaceous substance, which they call *Sal Armoniack*.

ARROGANCE, is painted in the person of a lady cloth'd in a green garment; with asses ears, holding under her left arm a peacock, and extending the right arm, points with her forefinger.

*Arrogance*, ascribes to itself what is not its own, therefore, it has the ears of an ass, for this vice proceeds from stupidity and ignorance; the peacock intimates the putting a value upon oneself, and despising others.

ARSENICK, is a ponderous mineral substance, extremely caustic or corrosive to the degree of a violent poison.

There are divers kinds of *Arsenick*, viz. yellow or native red, and crySTALLINE.

Native *Arsenick*, is of a yellow or orange colour; whence it is also call'd *auripigmentum* or *orpiment*.

It is chiefly found in copper mines, in a kind of glebes or stones, of different sizes and figures.

As to the colour, though it is always yellow, yet admits of divers shades and mixtures, as a golden yellow, reddish yellow, green yellow, &c.

It is found to contain a small quantity of gold; but so little as not to quit the cost of separating. Of this are prepar'd two other sorts of *Arsenick white* and *red*.

*Red Arsenick* call'd *Realgal*, is only the native yellow rubified by fire.

The *white* or *chrySTALLINE*, is drawn from the yellow by subliming it with a portion of sea salt.

*White* and *yellow Arsenick*, are also procurable from *cobalt*, the method of which as practis'd in *Hungary*, is as follows.

The

The *cobalt* being reduc'd to powder, and the light sandy part wash'd off by a current of water, what remains is put into a furnace; the flame of which passing over the powder takes the arsenical part along with it in form of a smoke; which being receiv'd by a chimney, and carried thence into a close brick channel, sticks by the way to the sides, and is scrap'd off in form of a whitish or yellowish powder. From what remains of the *cobalt*, they proceed to make smalt.

The smallest quantity of any of these *Arsenicks*, being mixt with any metal renders it friable, and absolutely destroys its malleability.

Hence the refiners dread nothing so much as *Arsenick* in their metals; nor could any thing be so advantageous to them as a menstruum, that would absorb or act on *Arsenick* alone; for then their metals would be readily purified, without flying off or evaporating.

A single grain of *Arsenick* will turn a pound of copper, into a beautiful seeming silver; this hint many persons have endeavour'd to improve on, for making of silver, but in vain, because it could never be brought to sustain the hammer; and some have been hang'd for coining species of this spurious silver.

*Of the colour of the best ASHES.* The colour of the best *Ashes* is a fine *blue* or *sky* colour. The manner of examining the colour is as follows, *viz.* by throwing a piece of very fine white cloth or crape over the *Ashes*; and if the ashes appear of a beautiful *blue* through the thin cloth, and the whiteness of the cloth plainly appears as spread over the *Ashes*; it is a satisfactory proof that the *Ashes* are the best and finest.

This sort of *Ashes* is us'd in the linen manufacture in *Brabant*, and by the thread bleachers; this is generally the scarcest sort, and bears the highest price, and is not only fit to give a lustre to linen; but is proper for all other manufactures, could it be had in great plenty.

*Of the bleachers ASHES in Holland.* The distinction between these and the former is more customary than useful: the *Dutch* bleachers buying one instead of the other; and preferring the latter to the former; but though the latter are sometimes in thinner barrels, and more glutinous than the former, yet in weight and strength, they are not to be compar'd with them.

*To dye cloth, &c. ASH Colour.* To dye a picee of fifteen ells of cloth, &c. of an *Ash Colour*, first dye it a sky colour with *woad* and *indigo*, then rinse it out clean and dry it, then  
 4 apply

## A S H

apply the following black; take four ounces of beaten galls, one dram of burnt *alum*, half a pound of vitriol; boil the dye and the stuff in it for half an hour, then pass it through and rinse it; then add to the suds three ounces of *brasile*, that has been before boil'd in a skillet in part, three quarts of sharp lye, half an ounce of rock salt or *sal Gemmæ*, and you will have a beautiful *Ash Colour*.

You may also prepare this colour brighter with galls, but if the lustre be not good, when taken out of the *woad* or *indigo* copper to try; then add four ounces of *sumach*, six ounces of *vitriol*, three ounces of *madder*, three ounces of salt, half an ounce of burnt *alum*.

But the first *Ash Colour* is the more beautiful and lasting.

*Another method of dying* ASH COLOURS. Take a sufficient quantity of water, nut galls bruis'd small eight ounces, madder two ounces, put all into the vessel and let them boil; then enter twenty yards of broad cloth and handle it, letting it boil two hours; then cool it and put in copperas two ounces, and then enter the cloth again and handle it; then let it boil a quarter of an hour, and cool it. If you would have it sadder, you must put in more copperas.

*Note*, That *handling* of it signifies to roll it on the roller, as it is boiling, and to let it all in again to hinder its spotting, and to make it take colour equally. *Cooling* it signifies to take it up and air it.

*Another Ash Colour*. Take of nut galls bruis'd six ounces, red tartar bruis'd four ounces, let them boil well one hour and half in the liquor: then enter twenty yards of broad cloth, and handle it well, and cool it; after which put in two ounces of copperas, and sadden it with copperas as you please.

*To dye the best Ash Colour*. Take fair water a sufficient quantity, red tartar four ounces, nut galls three ounces, bruise them small and enter twenty yards of cloth, boil it an hour and half; then cool and sadden it as you think fit.

*Another way to dye an Ash Colour*. Take a sufficient quantity of water, put it into the copper, put into it six ounces of nut galls bruis'd small; let the copper boil and then enter your cloth; and let it boil an hour and half, and then cool the cloth, then put in four ounces of red tartar, which dissolve: then put in the cloth again, and let it boil half an hour; then take it out, cool and air it: Lastly, Put in half an ounce of copperas and let it melt, enter your cloth again, and sadden it as you please. This will dye three pounds weight.

*Another Ash Colour*. Take a sufficient quantity of water, six ounces of galls bruis'd small: put them into a caldron and let them boil, then enter the cloth for the space of an hour and a

## A S S

half, then put in five ounces of red tartar (having first taken out the cloth) which dissolve, and put in the cloth again, and boil it for half an hour, then take it out, cool and air it: Lastly, Put in half an ounce of copperas, and as much white vitriol, dissolve them, then enter your cloth again, and it will be a good colour to dye three or four pound weight.

*Another kind of Ash Colour.* Take a sufficient quantity of water, and add to it nut galls beaten small four ounces, cochineal half an ounce; boil them together, and enter your cloth and let it boil an hour and a half, and then cool the cloth: then put in four ounces of copperas, and then enter the cloth again and sadden it. This will dye twelve pounds of yarn or cloth.

**EDMUND ASHFIELD**, a gentleman well descended, who drew both in oil and crayons, he was disciple to Mr. *Wright*, and painted some heads as big as the life; he first found out the way to multiply the number and variety of tints in *crayons*, and therewith to draw various complexions in imitation of oil painting; this he performed on paper, and practis'd several years with deserv'd applause; he brought those heads to ten pounds price a piece.

From him Mr. *Luttrell* had his instructions, who has improv'd that invention, and multiplied the variety of colours to effect any thing, as also found out a method unknown before to draw with these chalks or crayons on copper plates, either by the life or historically.

**ASIA**, is represented in painting, &c. wearing a garland of various flowers and fruits, clad in a rich vestment embroidered; holding in her right hand branches with roots of *caffia*, pepper and cloves, and in her left hand a censer smoking; and by her a camel on its knees.

The garland intimates, that *Asia* produces delightful things necessary for human life; her garment the great plenty of those rich materials; the bundle of spices, that she distributes them to other parts of the world. The censer signifies the odoriferous gums and spices it produces; and the camel is a beast proper to *Asia*.

**MICHAEL L'ASNE**, engrav'd the rudiments of designs and other plates, and us'd the mark. See the plate No. 10.

**DOUBLE ASPECT** [in painting] is us'd, where a single figure is so contriv'd, as to represent two or more different objects, either by changing the position of the eye, or by means of angular glasses.

**ASSIDUITY**, is represented in painting as an ancient woman, holding in both her hands an hour glass, and on one side her is a rock, surrounded with a branch of ivy.

Her

## A S T

Her age denotes that time and labour are continually destroying us, and she therefore holds an hour glass, which requires diligence in turning and often moving it, lest it stop.

ASSISTANCE, is represented in painting, &c. by a man in years, clad in white, and over all a purple mantle; a ray shining round him, crown'd with a garland of olive; a chain about his neck, and a heart for a pendant; his right arm is extended, and his hand open; in his left hand he holds a stake surrounded with a vine, and at his right is a stork.

His age intimates his *discretion*, not being intent upon *avarice*, in giving his helping hand.

The white raiment indicates his *sincerity*, without self interest. The splendid ray denotes *divine assistance*, without which, as the wife without the husband, it is like the vine without the stake; the stork the natural affection of parents.

ART, is represented in painting by an agreeable woman, who seems to be ingenious by her very looks, she is habited in a gown of green, holding in her right hand a hammer, an engraving tool and a pencil, and in her left hand a stake that supports a vine.

The agreeableness of her countenance declares the charming nature of Arts, attracting all eyes to it, and gaining the author's approbation and commendation; the three instruments are for imitating nature; the stake supplies nature's defects in holding up the tender plant.

ARTIFICE in painting, &c. is represented as a comely man in a richly embroidered garment, laying his hand upon a screw of perpetual motion, and by his right he shews a hive of bees.

He is nobly cloth'd, because Art is noble of itself, his hand upon the screw shews, that engines have been contriv'd by industry, and by those incredible things like the perpetual motion have been perform'd.

The hive intimates the industry of bees, which being considerable, are nevertheless great as to their conduct.

ASTONISHMENT proceeds from an excess of admiration, which surprize is sometimes so strong, as to drive the spirits towards the place from whence the impression of the object is receiv'd; and being so much employ'd in considering this impression, that there remain no spirits to pass through the muscles; the body becomes immoveable as a statue.

How this passion is represented in drawing and painting, see the figures of admiration and astonishment in the plate.

ASTRONOMY, is painted with a silver crescent on her forehead, an azure mantle, a watchet scarf, besprinkled with golden stars.

## A U R

It is also represented as a lady in a starry habit, her eyes looking towards heaven ; holding in her right hand an astrolabe, and in her left a table of astronomical figures.

Her garments denote the night, the most proper to see the stars in ; her eyes and thoughts always elevated and intent upon celestial bodies, the astrolabe measures the distance of them ; the table shews the difference of it from astrology.

**ATTITUDE** of *Attitudo* Italian *q.* of *Aptitudo*, L. is in painting and sculpture, the posture of a figure or statue, or the disposition of its parts, by which we discover the action it is engag'd in, and the very sentiment, suppos'd to be in the mind. See **ACTION**, **FIGURE**, **STATUE**.

The representing these in a strong and lively manner, makes what is call'd a *good Expression*. See **EXPRESSION**.

**AVARICE**, is represented in painting by an old woman, pale fac'd, lean and melancholy, afflicted with a pain, which makes her lay one hand upon her belly ; yet seems to devour a purse with her eyes, which she grasps in the other, accompanied with an hunger starv'd wolf.

Her paleness proceeds from her *Envy*, that torments her to see her neighbours richer than herself ; her eyes are fixt on her purse, it being her chief delight ; the wolf denotes the voracious appetite of the covetous, who would have other men's goods by hook or by crook.

**AVERSION** may be express'd in drawing by the posture of the body, thus ; the body may be represented as retiring backwards ; the hands as if they were pushing off the object, which causes the *Aversion*, or else they may be drawn back, as also the feet and legs.

**AUGURY**. Good *Augury* is represented in painting, by a young man cloth'd all in green, having a star over his head hugging a swan.

The green clothing is a token of *hope*, and consequently of good luck, because greenness promises a plentiful crop, the star denotes good success, and a person not to be (as we say) born under a three-penny planet ; the whiteness of the swan is also an emblem of fortunateness ; as a black crow is of bad luck.

**AUGUST**, is represented by a young man of a fierce countenance, clad in a robe of flame colour ; crown'd with a garland of wheat ears ; having on his arm a basket of summer fruits ; at his belt a sickle bearing a virgin.

**AURORA**, *i. e.* the morning is personated by poets and painters. *Homer* describes her like a young virgin, having her hair dishevell'd, and hanging loose about her shoulders ; being of the colour of the purest gold, sitting in a golden chair, with all her vestments of that hue and colour.

*Virgil*

## A U T

*Virgil* describes her, as coming, at the very instant of fable night's departure, with one of her hands full of roses, gilliflowers and lilies, taken out of a basket which she carries in her other hand, besprinkling them on the marble pavement of the lower heaven, adorning the sun with unspeakable beauty.

She is also represented as a young virgin with carnation wings, and a yellow mantle, in her forehead a star, and golden sunbeams from the crown of her head, riding upon *Pegasus*; with a phial of dew in one hand, and various flowers in the other, which she scatters upon the earth.

She is also describ'd, holding in one hand a flaming torch, and drawn in a gorgeous chariot, bespangled with stars, by wing'd *Pegasus*; which favour she is feign'd to have obtain'd from *Jupiter*, by many importunate requests, presently after the downfall of *Bellerophon*.

She is fabled to be the herald and messenger of *Phæbus*, and as receiving her being from the virtue of his beams; and is no other than that rubicund and vermilion blush of the heavens, which the sun's first appearance works in the *orient*, and from thence descending beautifies our *hemisphere*, with such resplendency.

She is also painted in a purple robe, and a blue mantle fring'd with silver.

AURUM MUSICUM, { a sort of liquid gold for writing:

AURUM MUSIVUM, § Take fine crystal and orpiment of each one ounce, pound them severally, till they are reduced to a very fine powder, then grind them together well with glair.

*With this you may write either with pen or pencil, and the letter or draught will be of a good gold colour.*

*Another way of making the same.* Take of the best *English* tin, an ounce, and of the best *Spanish* quicksilver the same quantity: make of them an *amalgama*, by putting the crude *mercury* to the melted *tin*, and stirring together; then reduce them by pounding into a fine powder, and mix them with flowers of *sal armoniack*, and flowers of *sulphur*, of each an ounce: calcine gently, till the *sulphur* is consum'd, and so will the *Aurum* [gold] stick to the upper crust or scoria.

This being finely powder'd, and ground with glair, will with pen or pencil give your figure or picture a golden colour. See 2d. Ed. *Pharm. Bat.*

AUTHORITY, is represented in painting like a grave matron sitting in a chair of state, richly cloth'd in a garment embroider'd with gold, holding in her right hand a sword, and in her left a scepter, and by her side is a double trophy of books and arms.



## B A C

Her age and gravity indicates *Authority*, as also do the throne on which she is seated, and the splendid habit the pre-eminence persons in *Authority* have over others; the sword lifted up denotes sovereign power, and the scepter is also an ensign of *Authority*.

AUTUMN, is represented in painting by a man at perfect age, cloth'd like the *vernal*, and likewise girded with a starry girdle; holding in one hand a pair of scales, equally poiz'd, with a globe in each; in the other a bunch of divers fruits and grapes.

Most of these are explain'd in the *vernal*, they being the same. The age denotes the *perfection* of this season, when fruits are ripe. The balance or *libra* is one of the twelve signs of the zodiack, which denote *Autumn*.

AZURE, a mineral colour, prepar'd from the *lapis Armenus Azure*, is very near of kin to *ultramarine*; being procur'd from the *Armenian* stone, much after the same manner as the other is from *lapis lazuli*. See p. 132.

*To dye an AZURE Colour.* Take *roche allum* and filings of brass of each two ounces, fish-glue half an ounce, vinegar or fair water a pint, boil it to the consumption of the half.

## B.

**B.** stands for *John Sebald Beham*. *Abbot Primateccio*, who in *France* was call'd of *Bologna*, also us'd the letter B for his mark. So also did *Il Bonasoni*, and so also did *Domenico Beccafumi* intersecting it with a line.

B. B. signifies *Bartholomew Beham* of *Norimberg*, he engrav'd at *Rome* and in *Bologna* with *Mark Antonio Raimondi*. The same letters were also us'd by *Bartholow Biscano* a *Genoese* painter, in such plates as were of his own invention.

B. B. A. F. signifies *Baccio Bandinelli* a *Florentine* Architect.

I. BACCHUS. *Philostratus* tells us that *Bacchus* was form'd in the likeness of a young man without a beard, of a corpulent and gross body, his face of an high colour and big; his head adorn'd with a garland of ivy leaves having on his temples two horns; and close by his side a certain beast, call'd a *Leopard* or *Panther*.

*This description is taken from the nature of wine (of which according to the fiction of the poets, Bacchus was the God) whose inventor and finder out was certainly Noah, as not only Moses, but Josephus and Lactantius affirm; whence he is by many suppos'd to be this God Bacchus.*

II. *Claudius* relates that his image or statue was made all naked; which indicated the nakedness of those, who abuse themselves



selves with wine ; by which means they reveal and open those things which ought to be conceal'd and kept hid.

III. *Diodorus Siculus* relates, that *Bacchus* among the *Greeks*, was represented in two several forms ; the one as a very aged man with a long beard, stiff and thick, the other of youthful years, of a pleasant and amorous aspect.

*The first form intimates the effects of the intemperate use of wine, which wears nature, and brings old age along with it ; the other shews, that it cherishes and revives the heart, if moderately us'd.*

IV. *Macrobius* informs us, that *Bacchus* was sometimes represented in the likeness of a young child ; sometimes of a youth, sometimes of a man ; and sometimes in the likeness of decrepid old age.

*By these were signified the four seasons of the year, the vine being dedicated to Sol, in whom they all exist.*

V. *Philostratus* likewise tells us, that *Bacchus* was oftentimes drawn cloth'd in women's garments, and in a long purple robe ; his head adorn'd with a coronet of roses, with companions and followers all of them in like loose and wanton garments ; habited some of them like rural nymphs, as the *Dryades*, *Orcades*, &c. some like sea nymphs, as the *Nereides*, *Syrens*, &c. some like Satyrs, *Fawns*, *Sylvans*, &c.

*The women's garments indicate, that wine makes a man faint, feeble and inconstant like to a woman.*

VI. *Pausanias* says, that the *Eleans* pictured *Bacchus* with a long beard, cloth'd in a long gown, hanging down to his feet ; holding in one hand a sharp hook, and in the other a bowl of wine, and many vine-trees and other fruitful plants round about him.

VII. The *Cyrenians*, a people inhabiting the further parts of *Persia*, depicted *Bacchus* in the likeness of a bull.

*By this was intimated that Proserpina (the daughter of Jupiter) brought him forth in that form.*

VIII. The statue of *Bacchus*, was also sometimes set forth and adorn'd with garlands made of fig-tree leaves, in commemoration of a nymph (as some say) call'd *Psyche*, who was by the Gods metamorphos'd into that plant.

*In like manner the nymph Staphilis (with whom Bacchus was also enamour'd) was transformed into the vine, from whence it is that those plants are so exceeding grateful and pleasant to this God.*

IX. *Bacchus* is painted with short brown curl'd hair, cloth'd with either a *Leopard's* skin or a green mantle, a tawny face, with a wreath of vine branches.

BACK PAINTING, *Metzo-tincto* prints with oil colours.

This art consists chiefly in laying the print upon a piece of clear crown or *Cock-bill* glass, of such a size as fits the print.

## B A C

In order to do this, take your print and lay it in clean water for two days and two nights, if the print be on very strong, close and hard gumm'd paper, but if upon an open, soft, spongy paper, two hours will sometimes suffice, or more according as the paper is.

The paper or picture having been sufficiently soak'd, take it out and lay it upon two sheets of paper, and cover it with two more, and let it lie there a little to suck out the moisture.

In the mean time, take the glass the picture is to be put upon, and set it near the fire to warm, then take *Strasburg* turpentine, and it being in a gallipot, warm it over the fire, till it is grown fluid, then with a hogs hair brush, (the hairs of which have been well fasten'd by wedging) and with that spread the turpentine very smoothly and evenly on the glass.

When this has been done, take the *metzo-tinto* print from between the papers, and lay it upon the glass; beginning first at one end, rubbing it down gently as you go on, till it lie close, and there be no wind bladders between.

Then with your finger or fingers, rub or roll off the paper from the backside of the print, till it looks black, *i. e.* till you can see nothing but the print like a thin film left upon the glass, and when you have done this, set it by to dry.

And when it is dry, varnish it over with some white transparent varnish, that the print may be seen through it, and then it is fit for *Painting*.

*Note,* You must be very careful in rubbing or rolling the paper off the print, so as not to tear it.

You may instead of soaking your prints two days and two nights, roll them up and boil them for about two hours, more or less (according to the quality of the paper) in water, and that will render it as fit for rubbing, rolling or peeling (as the other way,) when rubb'd with your fingers.

This being done, and your oil colours prepar'd according to the directions given (which you will find under each article as red, blue, green, &c.) they being ground very fine, and temper'd up very stiff, lay on the backside of the transparent prints, such colours as each particular part does require; letting the master lines of the print still guide your pencil, and so each particular colour will lie fair to the eye on the other side of the glass, and look almost as well as a painted piece, if it be done neatly.

*Note,* That the shadows of the print are generally sufficient for the shadow of every colour, but if you have a mind to give a shadow by your pencil, then let the shadows be laid on first, and the other colours afterward.

Take notice also, that in laying on of colours in this kind of *Backside Painting*, you need not be curious as to the laying them

them on smooth. This is not at all requisite here, where the chief aim is only to have colours appear well on the foreside of the print; and therefore the only care to be us'd in this work, is to lay the colour thick enough, that its body may strike the colour of it plainly through the glafs.

BAL. SEN. signifies *Baldassar Senense*, i. e. *Baldassar Peruzzi* of *Siena*.

HB. HANS BALDUNG or BALDUIN, in a plate representing horses, engrav'd in 1534.

The same mark was us'd by *Hans Brosamer*, in his plates of *Curtius* riding into the gulph, and in his *Lacoon*, and *Solomon* worshipping the idol. See plate No. 11.

*Horatio Borgiano*, also made use of the same mark in his plates, and sometimes us'd an H and a B.

BACCIO BANDINELLI, born in the year 1487, scholar of *Gio. Francesco Rustici*, liv'd at *Rome*, excell'd in history painting and sculpture, died in the year 1559, aged seventy two years.

I. BANTAM-WORK, as the JAPAN-WORK, is both plain and emboss'd, and is wrought most in gold and other metals. So the *Bantam-Work* is also plain and carv'd, and is wrought most of it in colours, with a very small scattering of gold here and there.

II. The wood is prepar'd for this work, the same as it is for the *Japan-Work*, and the priming with whiting is the same: and as to the flat-work it is done in colours, mixt with gum-water, as the nature of the design requires, the ordering which colours with the gum-water, is taught in *Japan-Work*, &c.

III. The carv'd work is perform'd after the following manner. Let either cabinet, tables, boxes, &c. be made of deal or some other coarse wood; prime it with *size* and whiting, letting it dry; this must be so often repeated till the priming is almost a quarter of an inch thick, letting it stand to be thoroughly dry between every time.

IV. But you must take notice of this, that the whiting and *size* must be made thinner than for *Japan-Work*, and for that reason it must be done so much the oftener; for if it is too thick, it will not only lie rougher and be apt to crack and flie off; but it will not so easily penetrate to the bottom of any crack, nor go into any little crevice, notch or hole, as it will certainly do, if it is pretty thin.

V. The piece being prim'd to its due thickness and thorough dry, is in the next place to be water plain'd, viz. to be rubb'd with a fine rag, and a little fair water; after which, being dry, rush it as smooth as you can.

VI. That

VI. *Then lay on the black and varnish it up with a good body; and after it has stood to dry for six or seven days, polish it with tripoli, water and a fine rag, rubbing it with an even, easy and gentle hand.*

VII. *When this has been done, trace and draw out your design with fine cinnabar and gum-water; in the very same manner you design to cut and carve it, with all the circumstantialness and exactness possible.*

VIII. *Make your human figures, birds, beasts and insects, houses, trees, flowers, rocks, &c. in their due measure and proportions; the foldings of garments, leaves of trees and plants, and all other things, draw them so, as if they were so to remain without the least alteration.*

IX. *Then being provided with a sharp graver, and other cutting instruments of different forms, cut out the work deep or shallow, as you think best, but taking care never to cut deeper than the whiting lies; for the wood itself ought not to be touch'd with the graver.*

X. *Also leave black strokes for the drapery and folding of garments, and for the distinguishing of one thing from another; carving where the white is, and leaving the black untouched, according as the pattern is; taking instructions also from the variety of Bantam pieces, which differ vastly from those of Japan, in the very manner of the draughts, as well as in their other performance and finishing.*

XI. *The carv'd work being cut out clean and smooth and finished, and the colours well mixt, lay them into your carv'd work, with fine and clean pencils, according as reason and the nature of the thing shall direct.*

XII. *The colours being laid on and finished, then lay on the gold on those places for which you design it; which may be either powder gold or brass dust, mixt with gum water; but rather let it be leaf gold, because it not only looks richest, but is that which the Bantam artists always use.*

XIII. *But the gum water it is laid with must be somewhat stronger; and must be laid on with a pencil, and while it is moist the gold must be laid on; being first cut with a very sharp, smooth edg'd knife into little pieces, either on a leather-cushion, or on a piece of leather straitly nail'd to a board.*

XIV. *Take up the gold with a little cotton, and with the same dab it close upon the work, and then (if your gum-water is strong) it will look rich and beautiful: otherwise (if it be weak) it will appear, as if it were hungry and starv'd when it is dry.*

XV. *When all these things have been done, clear up the black with oil, but without touching the colours, lest you should rub them off or fully them; for this is not secur'd as the flat Bantam-*

*tarn-Work* is; if any wet should come to them, the colours would spoil and come off.

In this case it is best to leave out the *tarnishing* colours, and only use such as you may apply the *securing varnish* to without loss of their splendor and beauty.

JOHN BAPTIST GASPARS, commonly called LELY's BAPTIST, was born at *Antwerp*, and brought up in the school of *Thomas Willeborts Boffaert*, a disciple of *Van Dyck*; coming over into *England* in the time of the civil wars, Major General *Lambert* took him into his service; and upon the happy restoration of King *Charles II.* Sir *Peter Lely* being received for his Majesty's principal painter, he employed *Baptist* to paint his postures, which he performed very well; after his death, he did the like for Mr. *Riley*, and afterwards for Sir *Godfrey Kneller*. This *Baptist* was a great judge of painting, and likewise eminent for his designs for tapestry, having been an admirable draftsman in the academy. He died in *London* about forty years ago, and lies buried at St. *James's*.

JOHN BAPTIST MONNOYER, commonly stiled the flower painter, was born at *Lisle* in *Flanders*, and brought up at *Antwerp*. His business there was history painting; but he afterwards returned to *Lisle*, and applyed himself to flowers, wherein he succeeded to admiration. *Monsieur le Brun* having undertaken the painting of *Versailles*, employed *Baptist* to do the flower part, wherein he shewed his excellence, as is yet to be seen in that palace.

His grace the Duke of *Montague* being embassador in *France*, and observing the curiousness of this painter's works, invited him over to *England*, and employed him in conjunction with Messieurs *Rouffeau* and *La Force*, to adorn his magnificent house at *Bloomsbury*, where a great variety of flowers and fruit of this master are to be seen, and those the best of his performance.

There are also several other pieces of his at the Lord *Carlisle's*, the Lord *Burlington's*, and other persons of quality; but the most curious of all is the looking-glass at *Kensington-house*, which he painted for the late Queen *Mary*.

They are also of an ordonnance very beautiful and surprizing, bearing a great price suitable to their worth. His best performances were owned to be in *England*. He died in *England* about thirty-six years of age, and lies buried in St. *James's*.

FRANCIS BARLOW was born in *Lincolnshire*, and at his coming to *London*, put apprentice to one *Shepherd* a face-painter, whom he lived with but few years, because his fancy did not lie that way, his genius leading him wholly to drawing of fowl, fish, and beasts, wherein he arrived to that perfection, that had his colouring and penciling been as good as his draught, which

## B E A

are most exact, he might easily have excelled all those that went before him in that kind of painting; of which we have an instance in the six books of prints after him, sold by Mr. *Tempest*. He drew some ceilings of birds for noblemen and gentlemen in the country.

He also drew several of the monuments in *Westminster-Abbey*, and in *Henry VII's* chapel, which were intended for a large edition of Mr. *Keep's Monumenta Westmonasteriensia*; but he died in the year 1702.

Caval. GIO FRANCESCO BARBIERI da CENTO, called GUERCINO, born in the year 1590, scholar of *Benvenuto Genuari*, liv'd at *Rome* and *Bologna*, excell'd in history, died in 1666, aged seventy six years.

FREDERICO BAROCCI, born in 1528, scholar of *Battista Venetiano*, studied *Rafaelle* and *Correggio*, liv'd at *Urbino* and *Rome*, excell'd in history, chiefly religious subjects, died in 1612, aged eighty four years.

DOMINICO BARRIERA of *Florence*, who went commonly by the name of *Dominico Florentino*, us'd the mark in plate 12. marked some plates D. 1647. the same mark was us'd by *Domenico Bonavera* an engraver of *Bologna*, and *Dominico Bettini* the painter, in his pieces of flowers and animals.

BASHFULNESS is represented by a virgin clad all in white, with a veil over her face of the same colour; holding a lily in her right hand, a tortoise being under her feet. The white vestment denotes her chaste intentions; her veil to hide her face intimates, that a virtuous woman ought rather to hide, than to expose her beauty. The lily also represents innocence and bashfulness; and the tortoise, that a chaste woman should not go much abroad.

BASSO RELIEVO } a piece of sculpture, the figures of  
BASS RELIEF } which do not project far, or stand out from the ground with their full proportion.

M. *Felibien* distinguishes three kinds of *Basso Relievo's*; in the first, the front figures appear almost with their full *Relievo*; in the second, they stand out but one half; and in the third, much less, as in coins, vases, &c. See RELIEVO.

B. C. *Equ.* stands for *Bartholomew Ceriolanus* of *Bononia*, Knt.

MARY BEAL was an *English* Gentlewoman, born in *Suffolk*, having learnt the rudiments of painting of Sir *Peter Lely*. She drew after the life, and had great numbers of persons of good rank sat to her; especially the greatest part of the dignified clergy of her time, an acquaintance she got by her husband, who was much in favour with that robe. She was little inferior to any of her contemporaries, either for colouring, strength, force or life, insomuch that Sir *Peter* was greatly taken



taken with her performances, as he would often acknowledge. She work'd with a wonderful body of colours, was exceedingly industrious, and her pictures are much after the *Italian* manner, which she learnt by having copied after several of the great masters of that country, whose pictures she borrowed out of Sir *Peter's* collection.

She died at her house in *Pall-Mall* about thirty two years ago, being sixty five years old, and lies buried in *James's*.

NICOLA BEATRICE *Lotharingius fecit*, used these marks. See plate, No. 13, 14.

BEASTS. For drawing the form of any beast, begin with your lead or coal at the forehead, drawing downward the nose, mouth, upper and nether chop, ending your line at the throat.

II. Then viewing it again where you began, from the forehead over the head, ears and neck, continuing till you have given the full compass of the buttock, then mark out the legs and feet.

III. Viewing it again, touch out the breast, with the eminency thereof; lastly, finish the tail, paws, tongue, teeth, beard, and several shadows.

IV. In drawing beasts you must be well acquainted with their shape and action, without which you will never perform any thing excellent in that kind: and here if you draw it in an emblem or the like, you ought to shew the landskip of the country natural to that beast.

As to the colouring of BEASTS.

I. SHEEP. Lay with a thin white, shaded with indigo and foot, and heightened with white.

II. HOGS. Lay with brown oker, shaded with foot, and heightened with masticot: you may as you see occasion colour the hair here and there with stronger brown oker; the eyes with vermilion, which you may heighten with masticot; the mouth with indigo, or white and black, shaded with black.

III. A BEAR with brown oker, red oker and black mixt; shadow with foot alone, or mixt with black, and heighten with brown oker and white.

IV. A WOLF with brown oker and foot, and shadow with more foot.

V. A gray WOLF with black, white and brown oker; shaded with black and foot, or black only; the mouth with black and red oker; shaded with black and foot heightened with red oker and white.

VI. The ELEPHANT (which is of a mouse grey) with black and white mixt with foot, and shaded with black and foot, and heightened with the same, with a little more white.

VII. The

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VII. The nose at the end of his trunk, inwardly must be laid with vermilion and cerufs, shadowed with black or black mixt with lake: in the same manner, the inner part of the ears, the eyes with white tending to a grey.

VIII. MICE are coloured as the Elephant. RATS a little browner.

IX. The UNICORN with a pure white, shaded with black; the chaps red, the eye and hoofs with a thin black.

X. The HART with brown oker, shaded on the back with foot, which sweetly drive towards the belly, and shade over again with a stronger foot.

XI. The *neck* and *belly* with white, the mouth and ears a little reddish; the hoof black, the horns with foot, and shaded with foot mixt with black.

XII. The HIND with the same colours as the *Hart*.

XIII. The CONEY with black and white; the *belly* all white, sweetened with black, and heightened with a stronger white.

XIV. The HARE with brown oker; the belly below a little whitish; shade on the back with foot, and heighten on the belly with white.

XV. APES, MONKEYS, and the like, with pink and black, heightened with masticot and white; lay the face with a thin black, mixt with foot, shaded with black and pink mixt with a little red oker.

XVI. CATS of grey and brownish, or tabby, with indigo, blue and white, heightened with pure white, and shaded with *Indian* blue and black mixt: if of other colours, you may use your discretion.

XVII. An ASS, colour with black, mixt with white like grey; if the Afs be of a mingled brown, black and white mixt with brown oker, shaded with black in the mouth; heighten with white.

XVIII. The LEOPARD with brown oker and red oker, mixt with black, shadow it with foot; the spots with red oker and black, the mouth with black and white, heighten him with light oker.

XIX. HORSES, OXEN, COWS, DOGS, and such like, if white, with white, mixt with a little foot or oker, shaded with a little black and white, and heightened with perfect white.

XX. If of a *chestnut brown*, with red oker and black, shaded with black and foot, and heightened with red oker and white.

XXI. If an *ash grey*, with black mixt with white, shaded with black, and heightened with white.

XXII. If *black*, with a thin black, shaded with a stronger black, and heightened with black and white.

XXIII. A



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XXIII. A bay HORSE, with vermilion and brown oker; or only with red chalk, shaded with red oker, and heightened with red chalk mixt with white.

XXIV. If *spotted*, by a mixture of the foresaid colours, and discreetly putting every one in his proper place.

*Gold BEATING.* First a quantity of pure *Gold*, is melted and form'd into an ingot; this by forging is reduc'd to a plate about the thickness of a sheet of paper, and this plate is afterwards cut into little pieces about an inch square, and laid in the first and smallest mould to begin to stretch them.

From what *Pliny* relates, we have no room to doubt but that the ancients, especially the *Romans*, had the same method of *Beating Gold* that we have, though it should seem they did not carry it to the same height.

If it be as *Pliny* relates, that they only made five hundred leaves four fingers square of an ounce of *Gold*; though he says they could make more.

The modern *Gold Beaters* do make *Gold* of divers thicknesses; but there are some so fine, that a thousand of them don't weigh above four or five drams.

The thickest are us'd for *gilding* on iron and other metals, and the thinnest for wood. See GILDING.

This *Gold* is beaten on a block of marble, commonly call'd *black marble*, of about four foot square, and usually rais'd three foot high; these plates are beaten with three hammers of different sizes, of well polish'd iron, something in the form of mallets. The first which weighs three or four pounds, serves to chase or drive; the second eleven or twelve pounds, which is to close; and the third which weighs fourteen or fifteen pounds, to stretch and finish.

Likewise four sorts of moulds of different sizes are us'd. These pieces of an inch square, are put into the first or smallest mould which is made of vellum, consisting of forty or fifty leaves, and after they have hammer'd a while thus with the smallest hammer, they cut each of them into four, and put them into the second mould of vellum, which consists of two leaves, to be extended farther.

Then they are taken out again, and cut into four, and put into the third mould, which is made of bullock's gut, well scour'd and prepar'd, and consisting of five hundred leaves, and beaten; then they are taken out and divided into four again, and laid in the last and finishing mould, which is also of bullock's gut, and containing five hundred leaves; and there they are beaten to the degree of thinness requir'd.

The leaves being thus finish'd, are taken out of the mould and dispos'd in little paper books prepar'd with *red bole*, for the  
*Gold*

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*Gold* not to stick to; each book usually containing twenty five leaves. These books are of two sizes, twenty five leaves of the smallest, of which weigh but five or six grains; and twenty five of the largest, nine or ten grains.

*Gold* is *beaten* more or less, according to the quality or kind of the work it is design'd for; that which is for the use of *Gold* wire-drawers to gild their ingots withal, is left much thicker than that for gilding picture frames, &c.

**BEAUTY.** Heavenly *Beauty* has been represented by an exceeding fine woman, naked, standing upright, with her hand reaching the clouds and encompassed with rays, holding in one hand a lily, and in the other a celestial globe.

**DOMENICO BECCAFUMI**, otherwise called **MICARINO da Siena**, born in the year 1484, copied after *P. Perugina*, and studied after *Michael Angelo* and *Rafaelle*; liv'd at *Rome* and *Siena*, excell'd in history, painting and sculpture, died in the year 1549, aged sixty five years.

**DOMENICO BECCAFUMI SANESE**, a painter and engraver, used this mark. See plate, No. 15. This mark is also found in certain wooden cuts copied from *Titian's* paintings. He died in 1549.

The **BEGINNING** is represented by a resplendent ray in a starry sky, enlightening the earth adorn'd with plants, surrounding a youth, with a cloud covering his privy members; he holding in one hand the figure of nature, and with the left a square wherein is the letter *A alpha*. The *ray* denotes the power of God being the first agent, the *stars* the power of the planets, the principle of generation, *nature* the beginning of motion; the *alpha A* the beginning of the *Greek* vowels, without which no word can be expressed.

*Belli fecit.* Means *James Belli*.

**GIOVANNI BELLINI**, born in 1421, liv'd at *Venice*, disciple of his father *Giacomo*, excell'd in history, portraiture and architecture, died in the year 1511, aged ninety years.

**GENTILE BELLINI**, born in the year 1421, disciple of his father *Giacomo*, liv'd at *Venice* and *Constantinople*, excelled in history, portraiture and architecture, died in the year 1501, aged eighty years.

1. **OIL of BEN.** The little nut which the *Arabians* call *Ben* is the same that is by the *Latins* call'd *nux unguentaria*, and by the *Greeks* *balanus myrepfica*, from which is taken an oil of very great use in the art of perfuming.

2. To make the *Oil of Ben*, blanch the nuts and pound them in a mortar, sprinkling them with wine; then put them into an earthen or iron pan, and heat them hot; after that put them into a linen cloth, and press them with an almond press; repeat

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repeat this till you have exprefs'd all the *Oil*, and then you will have the *Oil of Ben by expression*.

3. After the same manner you may exprefs the *Oil* out of citron seeds, that is also incomparable for this purpose to extract the scent out of *musk*, *civet*, *amber* and the like, because it will not quickly grow rank; yet *Oil* of the *Nut Ben* is much better.

4. This *Oil of Ben* hath two properties; the one is, that having no scent or odour of itself, it alters, changes or diminishes not the scent of any *perfume* that is put into it: the other is that it is of a long continuance, so that it scarcely ever changes, grows rank, corrupts or putrifies, as other oils do.

5. To make a perfume of this, put the *musk*, *amber*, &c. in fine powder into it, keep it in a glass bottle very close stopp'd for a month or more, and then use it.

6. Or thus: Blanch your nuts and bruise them (hazle nuts may do though not so good) and lay them between two rows of flowers, as suppose *roses*, *jassemin*, &c. or other perfumes; when the flowers have lost their scent and fade, take them away and put fresh ones in their places; which repeat so long as flowers are in season; then squeeze out the oil, and it will be most odorous.

7. Lastly, by this last you may draw a sweet scent out of flowers, out of which you cannot distil any sweet water.

**BENEFICENCE**, is emblematically describ'd by a damsel of an agreeable, pleasant aspect; young, because the remembrance and acknowledgment of benefits should never grow old; beautiful, because *Beneficence* charms every one; naked, to shew that it ought to be without interest or ostentation; holding in one hand a bag of gold and variety of jewels, as ready to distribute them; and in the other a chain of gold to signify that *Beneficence* ties and obliges.

**PIETRO BERETINI da CORTONA**, born in 1696, scholar of *Baccio Carpi*, liv'd at *Rome* and *Florence*, excell'd in history and architecture, died in the year 1669, aged seventy three years.

**B** CORNELIUS BERGHEM or BERCHEN, used this mark.

**BERYL**. I. To make a Beryl colour or green blue, viz. a sea green for glass. Take crystal frit without *manganese* what quantity you please, melt it very thin and skim off the salt (which will swim on the top like oil) with an iron ladle, or else the colour will be foul and oily: the matter being purified to twenty pound of it, put of calcin'd copper [see **CALCINATION** of **COPPER**] six ounces, *saffer* prepar'd an ounce and a half, mix them well together: put this mixture into the pot of metal

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by little and little, for fear the crystal should rise or swell and run over; keep it stirring all the while, and then let the metal stand and settle for three hours, that the colour may incorporate, and then stir it again.

Make proof of it, and after the powders have been mixt for twenty four hours, and having been stirred and mixed well, it may be wrought; because the colour is very apt to fall to the bottom.

*To make a paste for a BERYL, or sky colour call'd aqua marina.* Take rock crystal prepar'd (see rock CRYSTAL) ten ounces, minium or red lead twenty five ounces, zaffer prepar'd five drams five grains, reduce them all to a very fine powder, mix them and put them into a crucible able to resist the fire, leaving an inch or more empty, cover it with an earthen cover, lute it well and dry it; put it into the hottest place of a potter's furnace, and let it stand as long as their pots; when cold break the crucible and you will find a fine sky colour. Or

Take rock crystal prepar'd ten ounces, *æs ustum* one ounce, and fifteen grains, mix them, and in a crucible perform the work as the former.

II. *Another Beryl or Aigue Marine.* Take ten ounces of powder of rock crystal, fine salt of tartar (see SALT of TARTAR) ten ounces, salt of vitriol nine ounces; being all finely powdered searced and mixed in a brass mortar proceed as in the first example.

III. *Another deeper Beryl or Aigue Marine.* Take ten ounces of rock crystal, of fine verdegrease three drams and one scruple, of fine salt of tartar thirteen ounces and a half, reduce all to a fine powder, mix them in a mortar, and proceed as before.

*Another way.* This *Beryl* colour is of a very fine sky colour, if you take one ounce of powder of crystal, one ounce of fine salt of tartar, and six ounces of salt of *vitriol*; the whole reduc'd to a fine powder in a brass mortar, and searced through a fine sieve, and proceed as in the others.

B. F. V. F. stands for *Baptist Francus Venetus*, fecit.

BICE. As blue BICE bears the best body of all bright blues us'd in common work, as house painting, &c. but it is the palest in colour; it works indifferent well, but inclines a little to be sandy, and therefore requires good grinding, and that on a very hard stone; it is a blue that lies best near the eye of any now in use except *ultramarine*; but this last is too dear to be us'd in ordinary work.

BIRDS. Begin the draught of them at the head (and beware of making it too big) then bring from under the throat the breast line down to the legs, there stay and begin at the pinions to make the wing, which being joined to the back line, will be presently finish'd. The

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The eye, legs and train must be last, (always letting in *Birds* as in beasts) the farthest leg be the shortest; their feathers, let them (as the hair in beasts) take their beginning at the head very small, and fall in one way backwards in five ranks, smaller and greater to conclusion.

### *The colouring of BIRDS or FOWLS.*

I. The EAGLE, colour with black and brown oker, shadow it with black; heighten the feathers with brown oker mixt with white,

II. Lay the *bill* and *claws* with saffron, and shade with foot and lamp black the eyes with vermilion, heightened with masticot, or with saffron shaded or deepened with vermilion, and the talons with black.

III. The SWAN with white mixt with a little black, heighten with fine and pure white, so that its plumes or feathers by that heightening may look well; the legs with a black colour.

IV. The *bill* with vermilion, shaded with lake, the eye, yellow with a black round in the middle, from which falls a blackish vein, descending to the bill.

V. The GOOSE with more white than black, *viz.* a light grey, heighten with a grey white; the legs with black, the bill like the *Swan*.

VI. The DUCK with a light grey, the head with a dark blue, and a dark green neck sweetly interwoven, the belly with white; the legs with black mixt with a little white, &c. but be sure to imitate the life.

VII. The TURKEY with black mixt with a little white, from the back towards the belly whiter by degrees, but the belly speckled with black; and in like manner the wings.

VIII. Shade him with black, and the wings with indigo shaded with stronger indigo, the bill with black, the eye blue, heightened with white.

IX. To represent him angry or provok'd, let the naked skin of his neck be a blood red, which lay with vermilion mixt with lake, shaded with lake; but otherwise lay it of a whitish blue colour.

X. The GRIFFON with saffron, shaded with brown oker or foot.

XI. The PHEASANT with grey made of white and black, the feathers of a white grey, let the whole be shaded with black, and heightened with pure white; the eyes like the *Falcon*, the legs with pink, and shaded with black.

XII. The FALCON with brown oaker, and black mixt with white, and shadowed with black, and sprinkled upon its breast;

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breast; heighten it with white, let his talons be black, above the eyes, lay with saffron, and shade with vermilion; the bill with grey.

XIII. The STORK with grey, heightened with white, and the corners of his wings (near one half) with black, his long bill and legs with vermilion, shaded with lake.

XIV. The OWL with cerufs, black and foot, shadowed with foot, and heightened with yellow oker and white, sometimes white alone; the eyes yellow circled with white, the legs of a brown yellow.

BISTRE,  $\gamma$  a colour made of chimney soot boil'd, and afterwards diluted with water, serving painters to wash their designs. Instead of this some use the strokes of a pen, some *Indian* ink, others a black stone, &c.

BLACK, the proper *Black* for painting in water colours, is *Ivory Black*, which if it be pure and well ground, is of use in painting in *miniature*, but is not proper for colouring *prints*; for 'tis too heavy a colour and hides the beautiful strokes of the graver, unless done with great care.

However if it be necessary to use *Black* by way of darkening a print, rather chuse a strong tincture of good *Indian* ink than the *Ivory Black*; but to colour pieces in *miniature* use the *Ivory Black* prepar'd as follows.

Grind the *Ivory Black* very well in gum water, then beat the white of an egg very well, till you perceive a kind of oily liquor settle to the bottom, this liquor mix with as much of the *Ivory Black* as you think will be proper to permit it to run freely in the pencil, and it will bear an extraordinary gloss; and if the object is shining, such as the wings of some beetles, mix with some of it a little white upon a *Dutch* glaz'd tile, till you find it light enough to relieve the shade, and then make another lighter mixture of the same; which being us'd on the brighter part of the subject, will produce the effect you desire.

*Printer's* BLACK is most us'd, because it is easiest to be had, and serves very well in washing.

*Note*, You must never put any *Black* among your colours to make them dark, for it will make them dirty, neither should you shadow any colour with *Black*, unless it be *Spanish* brown, when you would colour an old man's gown, that requires to be done of a sad colour, for whatever is shadowed with *Black* will look dirty; and not bright, fair and beautiful.

*Ivory* or *Velvet* BLACK, is made of *Ivory* burnt, generally between two crucibles well luted: which being thus rendred perfectly *Black*, and in scales, is ground in water, and made into troches, or little cakes us'd by the painters; as also by the jewellers, to blacken the bottom or ground of their collets; wherein

wherein they set their diamonds, to give them their teint or colours.

*Lamp* BLACK, is the *Smoke* of rosin, prepar'd by melting *Smoke* BLACK, and purifying the rosin in iron vessels, then setting fire to it under a chimney or other place made for the purpose, and lin'd at the top with sheep skins or thick linen cloth, to receive the vapour or *Smoke* which is the *Black*; in this manner they prepare vast quantities of it at *Paris*.

This *Black* may also be made by the burning of *Lamps*, having many wicks, covered with a very large top at a due distance, to receive the *Smoke*, which continually sticking upon the top, produces this *Black* colour; the top of this *Lamp* may be taken off every half hour, and the *Black* swept off it; then the wicks being snuffed, and the cover or top being put on again, repeat this till you have what quantity of colour you desire, or till all the oil is burnt out; this *Black* is of excellent use for *Black* varnish. A quart of oil worth about six or eight pence will make (as some say) *Black* enough to do a large cabinet.

In *England* it is usually prepared from the resinous parts of woods, burnt under a kind of tent, which receives it; it is us'd on various occasions, particularly in printers ink; for which it is mixt with oils of turpentine and linseed, all boil'd together.

This is to be minded, that this *Black* takes fire very readily, and when on fire, is very difficult to be extinguish'd; the best method of putting it out is with wet linen, hay or straw, for water alone wont do it.

*A way to make Lamp Black better.* Make a fire shovel red hot, and lay the colour upon it, and when it has done smoaking it is enough; it may be us'd with gum water and ought not to be ground when us'd with oil.

*To make a finer Lamp Black than is usually sold.* It is made with lamps of oil, something being laid close over to receive the *Smoke*.

*German or Frankfort* BLACK, is made of the lees of wine burnt, then wash'd in water and ground in mills for that purpose, together with ivory or peach stones burnt.

This *Black* makes the principal ingredient in the rolling-press printers ink.

It is most generally brought from *Frankfort*, *Mentz* or *Straßburg*, either in lumps or powder.

That which is made in *France*, is not so well esteem'd as that made in *Germany*, by reason of the difference of the lees of wine us'd in the one and the other; though on the other hand some prefer that made at *Paris* to that made at *Frankfort*.

*Foreign Lamp* BLACK, is no other than a soot rais'd from the rosin and fat parts of fir-trees.



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It comes mostly from the northern countries, as *Sweden* and *Norway*; 'tis a *Black* that is more generally us'd than any other, because of its plenty and cheapness, and proves a very good *Black* for most uses; 'tis of so fine a body that if it be only tempered with linseed oil, it will serve to work with on most common occasions; without grinding; but being thus us'd, it will require a long time to dry, unless some drying oil be mixt with it; or which is better some verdigrease finely ground, this and the drying oil together, will make it dry in a little time.

Some add also oil of turpentine; and without these it will not dry under a long time, for in the substance of the colour is contain'd a certain greasy fatness, which is an enemy to drying.

In order to remedy which, burn it in the fire till it be red hot, and cease to smoke, which will consume that fatness, and then it will dry much sooner; but when it is burnt it must of necessity be ground in oil, for else it will not work fine; for fire is of that nature, that it is apt to harden most bodies that pass through it. See *the article BURNING of COLOURS*.

This colour is usually brought over to us in small boxes, and barrels of deal of several sizes.

There is a **BLACK** made of willow charcoal, which if ground very fine, does in oil make a very good *Black*; but not being so easy to be gotten as the *Lamp Black*, 'tis seldom us'd.

*To make a BLACK from Sheeps feet.* Take *Sheeps* bones, calcine them in an oven, or in a crucible in a furnace, and quench them in a wet cloth; they must be ground in water before any gum is put to them.

This *Black* will mix with lake and umber for carnation in *miniature* or water painting.

*To dye wood, Horns and bones BLACK.* Dissolve vitriol in vinegar or spirit of wine, and infuse them in it.

*Another way.* Take litharge and quick lime of earth two pound, mix them with a sufficient quantity of water and put in the bones, and stir with a stick till they boil a-pace; then take it off the fire, and stir till it is cold, and the bones will be very *Black*.

*Spanish BLACK* is so call'd, because first invented by the *Spaniards*, and most of it brought from them, is no other than burnt cork, us'd in various works, particularly among painters.

*Earth BLACK*, is a kind of coal found in the ground, which being well pounded is us'd by painters in fresco.

There is also a kind of **BLACK** made of silver and lead, us'd to fill up the cavities and strokes of things engraven.

*BLACK for painting or staining glass.* Take scales of iron from the smith's anvil, grind them for three hours on a shallow, copper or brass plate (such as spectacle makers use to grind their glasses



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glasses upon) take of this powder and of *Rocaille* of each what quantity you please, add to them a little calcin'd copper to hinder the iron from turning red in the fire; grind all to an impalpable powder, and keep it in a glass close stopp'd for use.

**BLACK.** *As a velvet BLACK for glass.* Take pieces of glass of several colours, to which add a little less than half the quantity of *Manganese*, as of *Zaffer*, and put the whole into a pot in the furnace.

This glass being well purified may be wrought, and it will give a glass like velvet, fit for many things.

*Another of the same, a much fairer velvet Black.* Take ten pound of *crystal frit* in powder, and one pound of calx of lead, and of tin the same quantity; mix them all well together, and put them into a pot, heated in the furnace; and when this glass is melted and purified, you must cast in an ounce and a half of steel calcin'd and powdered, and one ounce and half of scales of iron from the smith's forge, powdered and mixt with the steel; mix the whole well as you cast them in, that the glass may not rise, and the better to incorporate them.

Then let all rest for twelve hours, during which time, stir them sometimes, then you may work it, and you will have a very fair velvet *Black* colour.

*Another velvet BLACK, fairer than the foregoing.* Take twenty five pound of *Rochetta frit*, half a pound of tartar, an ounce and half of *Manganese* prepar'd, reduce all to powder, and mix them well together, put them into a pot, which set into the furnace leisurely, that the matter don't rise too much. Let it melt and purify during the space of four days or thereabouts, mix the materials well, cast them into the water the better to purify, and then melt them again; and you'll have a *Black* of an extraordinary beauty.

*Dyers BLACK*, is one of the five simple and mother colours us'd in *dying*. It is differently made according to the different quality and value of the stuffs to be *dyed*.

For broad cloths, fine ratines, druggets, &c. they use pastel, or woad, and indigo; the goodness of the colour consists in there not being above six pounds of indigo to a ball of pastel, when the pastel begins to cast its blue flower, and in its not being heated for use above twice.

The stuff being thus *blued*, is boil'd with allum or tartar, then maddered, and lastly, the *Black* given with galls, copperas and sumach; to bind it and prevent its smearing in use, the stuffs are well scower'd in the fulling mill, when white, and then well washed afterwards.

For stuffs of less value, 'tis sufficient, that they be well *blued* with pastel, and black'd with galls and copperas. But no stuff

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can be regularly *dyed* from *white* into *Black*, without passing thro' the intermediate *blue*.

Yet there is a colour call'd *cold Black* or *Jesuits Black*, prepar'd of the same ingredients as the former, but without being first *dyed blue*.

In this case the drugs are dissolv'd in water, that had boil'd four hours, and stood to cool till the hand would bear it; then the stuff is dipt in again and again; and taken out six or eight times.

Some prefer this *Black* to the other, but on weak grounds this method of *dying Black*, is said to have been invented by the *Jesuits*, and to be still practis'd in their houses, where there remain numbers of *dyers*.

I. *To dye BLACK.* Take six handfuls of alder-bark or alder-tops, more or less, made small, put them into a copper with a sufficient quantity of water, and boil them for an hour with a very good fire; then take them out and put in two pounds of nut-galls bruis'd small, one pound of sumach, and four ounces of log-wood, and boil them; then enter twenty yards of cloth and handle it, and boil it for four hours; then take it out and cool it, and put in a pound of copperas; which when it is melted enter the cloth again and handle it, then boil it an hour and cool it again; then put in two gallons of chamber-lye, and enter the cloth again, and let it boil for half an hour more, then take it out, cool it and wash it well.

II. *To dye a Black upon blue.* Take about nine or ten gallons of water, as many ounces of nut-galls beaten: wool, woollen yarn or woollen cloth or flannel, to the weight of about three pounds: let them be boil'd for four hours; after which take the matter out and air it; then put into the liquor eighteen ounces of green copperas, and if there be not liquor enough left, put in more water, as much as will cover the stuff, &c. and boil it for two hours, handling it continually.

Then take it out and air it, then put it in again, and take it out again and air it, and put it in again till it is *Black* enough; after this cool and wash it.

But take notice if you put in some sumach with the galls, it will make a better *Black*.

III. *Another Black dye.* Take fair water a sufficient quantity, of nut galls bruised a pound, of sumach half a pound; of alder-bark and oak bark, of each a quarter of a pound; make them boil, which when the water, &c. begins so to do, put in a little cold water, to break the boiling; stir all well together and enter your cloth, letting it boil for three hours; after this take it out, and put in more fresh water, and make it boil again, adding to it a pound of copperas, which when it is dissolv'd put in your cloth again, and boil it two hours; then take it out again,  
and

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and put in some more copperas, and half a pound of ground logwood, make it boil and put in the cloth again, and let it boil an hour.

This quantity of drugs will dye five yards of broad-cloth, or ten yards of cloth three quarters wide.

IV. *Another Black dye.* Take water a sufficient quantity, logwood ground, sumach of each a pound, of nut galls bruis'd small two pounds; boil them together for an hour, then enter the cloth, wool, yarn, &c. and when they have boil'd an hour take them out, cool and air them; then put in three pounds of copperas, let it melt, and then put in the cloth, wool, &c. again, and let it boil near an hour, then take it out and wash it.

These quantities of drugs will dye twenty pound weight of any of the former things.

V. *Another to dye twenty yards of broad-cloth, &c.* Take water a sufficient quantity, and five handfuls of sumach, two handfuls of logwood ground, two handfuls of alder-bark bruis'd small, boil them all together; then put in your cloth, and let it boil three hours; then take it out, cool and air it, and make it *Black* with a sufficient quantity of copperas.

VI. *Another Black for twenty yards of broad-cloth.* Take water a sufficient quantity, of nut galls bruis'd small two pounds, of alder-bark a pound an half, mix all together in the copper, and set it a boiling, and when it does so put in the cloth, letting it boil for three hours; then take it out and let it cool; then put in half a pound of copperas, and when it boils, put in your cloth again and boil it for an hour more; handle it and boil it for an hour, then take it out and cool it; after which put in more copperas and some urine, then put the cloth in again, and boil it till it is *Black* enough.

VII. *Another Black colour.* Take a sufficient quantity of water, and a pound of nut galls bruis'd small, of logwood ground and sumach half a pound, of alder-bark a quarter of a pound, make them boil and enter the cloth; then cool and air it, and then darken the colour as you desire it with a pound and half of copperas.

This quantity is enough for fourteen pounds of wool, yarn, cloth, &c.

VIII. *To make a firm Black dye.* First wadd it with the blue (see DYING BLUE) then take water thirty quarts, one pound of galls bruis'd small, and of vitriol three pounds; first boil the galls and water with the stuff or cloth for two hours; then put in the copperas as a cooler; heat for one hour, after which take out the cloth or stuff, and cool it and put it in, boiling it for another hour; lastly, take it out again, cool it, and put it in once more.

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IX. *To recover the colour of Black-cloth when decay'd.* Boil the leaves of fig-trees well in water, wash the cloth in it, dry it in the sun, and it will be a much fairer *Black*.

*To dye Martins skins with long hair of a very good Black, which never fades.* Take a sufficient quantity of water, two pounds of new nut galls, and two ounces of beef marrow; boil them in an earthen pot close covered, stirring often lest the galls burn, and boil, till it makes no noise when you stir it, then beat it, and strain out:

Take of this liquor two pounds, copperas twelve ounces, roch allum twelve ounces, litharge eight ounces, verdegrease, sumach and sal armoniack of each four ounces; pound each of them small distinct by itself, then mix and boil them together, and keep the liquor to dye with.

But this is to be minded; before you apply the liquor, the skins must be wash'd two or three times in very pure, clear, lime water; and when you apply the dye you must do it with a pencil against the grains of the hair, and afterwards the other way too.

These skins when dry, differ little or nothing from fables. Some leave the verdegrease out, but it does no hurt to the liquor.

*To dye cloth or stuff BLACK.* Take two pound of galls, half a pound of *brazile*, two pound and a half of *madder*; boil your cloth three hours with these, then take it out and cool it very well, and put in an ounce and half of *sal armoniack*, and boil the stuff gently for half an hour, rolling it upon the roller three times every quarter of an hour, then take it out and cool it; and afterwards add two pound and a half of *copperas*, one third part of a pound of *brasile*, a quarter of a pound of tallow; boil the stuff in it very well for an hour and a half, and it will be of a beautiful *Black* colour.

*To dye woollen stuffs, &c. BLACK.* Put into a kettle two pound of galls, half a pound of *brasile*, two pounds and half of *madder*, with which boil the stuff for three hours; then take it out and cool it very well; then add an ounce and half of *sal armoniack*, and boil the stuff gently half an hour, rolling it upon the roller three times every quarter of an hour; then take it out and cool it; and afterwards add two pounds and a half of *copperas*, five or six ounces of *brasile*, and a quarter of a pound of tallow; boil the stuff very well in it for an hour and a half, and it will be of a beautiful *Black* colour.

*Another BLACK dye.* Fill a kettle with very clear water, in order for dying ten pieces of frize or coarse stuff, put in it two pound and a half of right *Turkish* galls, and a pound and half of brown wood or walnut-tree; boil them very well together, then put in the stuffs and let them boil two hours, and also  
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lie a whole night in the liquor ; take them out, and if you have any old dye suds, that have been us'd before, pour it to the *gall liquor*, and add two pound of *copperas* ; let them be boil'd well, then put in these stuffs ; let them be boil'd for two hours, and afterwards left a whole night in the liquor, then rinse them out, and hang them up to dry carefully and nicely, if it be in a kiln or stove it will be so much the better ; then rub them with a pumice stone, and smooth them very well, then pour the dye out of the kettle and keep it, and repeat the operation mentioned in every particular ; iron the stuff a little with a hot iron, and after you have done this, take water and two pound and half of *Turkey galls*, one pound and a half of brown wood, and dye them a third time after the same manner, and they will be *Black* enough.

But if you would have the dye more *Black* and beautiful, take a kettle full of fair clear water, put into it half a pound of calcin'd *vitriol*, and one pound of *tartar*, boil the stuffs in this liquor for an hour, then rinse them out, and put fresh water into the kettle, and for every piece of twelve ells, put in half a pound of brown wood, and boil the stuffs half an hour ; and if you would have the *Black* yet finer and better, then dye it once in the following foot dye.

*The Soot dye.* Gall the stuff with alder-bark and galls for three hours, and add lye and suds to blacken the gall dye ; boil the stuff in the liquor for 2 hours ; then add *copperas* and leave the ware in a whole night, and then rinse it out.

*To dye the Hamburg BLACK.* It is to be suppos'd, that the stuffs have been first blued with woad or *indigo*, in a manner that is lasting.

Take twelve ounces of *tartar*, one pound of *vitriol*, boil the stuffs in it for two hours, then rinse it clean and dry it.

*Blue it as follows.* If your dye be either *woad* or *indigo*, yet you must give the stuffs a deep ground, which will give them a brighter luster.

For the second blue, boil woad and brown wood, and blue the stuff to the depth of *indigo*, or to a sort of iron grey, after which, it will be easy to dye it black ; but the nicety lies in the bluing. After the bluing, the stuff must be rinsed clean, and dried again. Then follows

*The Gallig.* Take six ounces of *galls*, two ounces of *madder*, a quarter of an ounce of calcin'd tartar, and therewith gall the stuff for the space of an hour, not rinsed but dry'd ; and then gall'd a second time, the suds being a little strengthened, or helped, as followeth.

*The second gallig.* Add half an ounce of *galls* to the remaining suds, and half an ounce of *madder*, one ounce of calcin'd

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cin'd *vitriol*, one ounce, not yet, of gum *arabick*; when you have done this, before the stuff is rins'd or dried, it must be

*Blackened in the gall liquor as followeth.* Boil the liquor, then take one pound of *vitriol*, first dissolv'd in spring water, which must be pour'd into the dye; then add to the *alder-black* half an ounce of galls, one ounce of *madder*, one ounce of *white gum*, one dram of *mastick*; and after the stuff has been died black in the dye, rinse it out clean and dry it, now as well as after the second blacking, which is to be done as followeth.

Take half a pound of *vitriol*, and immediately afterwards half an ounce of *galls*, one dram of *mastick*, half an ounce of gum *tragacanth*, and both times let the stuff be an hour a blackening, till it hath got a lasting dye; and besides all you may if you please add some *brown-wood* to give it the better lustre, and preserve it from spoiling.

*The way of dying stuffs, the sumach dye, so as it shall be very lasting.* Put the eight following drugs into a large vessel, viz. eight pound of *sumach*, eight pound of *alder-bark*, twelve pound of *oak shavings*, nine pound of *vitriol* of copperas, two pound of wild or bastard *marjoram*, six pound of filings of iron, and as much lye as is necessary, six pound of walnut-tree leaves, half a pound of calcin'd *tartar*, two pound of salt, and four pound of small shot; put all these in when the water is hot, taking care that the vessel is full, and look after it daily.

First boil the stuff in the preparatory suds, compos'd of three quarters of a pound of *tartar*, and one pound of *vitriol*, for the space of an hour and half; then rinse and dry it, then follows the galling.

Take one pound and a half of *sumach*, four ounces of *madder*, an ounce and half of calcin'd *salt petre*, one dram of *sal armoniack*, an ounce and half of *vitriol*, half an ounce of calcin'd *tartar*; divide these drugs into two parts, and take two parts of galls also; put in the stuffs, take them out, but do not rinse them, and hang them up to dry; then follows

*The Blackening.* Fill the *sumach* copper with prepar'd dye, twice or thrice, and for every time add four ounces of *vitriol*, two ounces of *sumach*, one ounce of gum *arabick*; and the last time superadd half an ounce of gum *tragacanth*, and a dram of *mastick*.

The stuff may be also boil'd with *brown-wood*, by adding six ounces of it to the first suds, as also half an ounce of gum *galbanum*, and an ounce of calcin'd *tartar* and *vitriol* mixt together.

*The preparation of the SOOT BLACK dye.* This dye is prepar'd and wrought the same way as the *sumach dye*; excepting that the ingredients are different.

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*The drugs of it are as follow.* Take eight pounds of *alder-bark*, six pound of *soot*, *oak-shavings* or *saw-dust*, five pound of *vitriol*, one pound of *wild-majoram*, three pound of *brown-wood*, twelve ounces of calcin'd *alum* and *vitriol* mixt together, two pound of filings, as much *lye* as is necessary, and five pound of walnut shells, if they are to be had.

Put all these in when the water is boiling hot, as in the *sumach* dye, and the stuff having been first of all prepar'd by boiling it an hour with six ounces of *tartar*, and half a pound of *vitriol*, and rinsed and dry'd; then gall it as follows,

With two ounces and a quarter of *galls*, and three quarters of an ounce of calcin'd *salt-petre* and *vitriol* mixt with this liquor.

It must be gall'd but once and not rinsed, but dried.

*Then dye it as follows.* Fill a kettle at two or three times, letting the liquor boil an hour every time, adding every time an ounce and half of *vitriol*, and two ounces of *soot*, half an ounce of *gum arabick*, and the last time a quarter of an ounce of *gum tragacanth*, half a dram of *mastick*, and a quarter of a pound of salt.

The stuffs may be also blackened with *brown-wood*.

*The Brown-wood dye is thus:* Take four ounces of *Brown-wood* first boil'd, a quarter of an ounce of *gum albanum*, half an ounce of calcin'd *salt-petre* and *vitriol* mixt together, and you will have a good *Black*.

*To dye GREEN Thread BLACK.* Take a proper quantity of sharp *lye*; and put into it three quarters of a pound of *brazile-wood*, boil them together, and afterwards pour the liquor into a vat, and add *gum arabick*, *alum* and *verdegrease*, of each one ounce; then put in the *Green Thread*, let it lie for the space of one whole night, and it will become *Black*.

*To dye SILK BLACK.* Pour three pails of water into a copper, and add two pound of *beaten galls*, and two pound of *sumach*, and two ounces of *madder*, four ounces of *antimony* reduc'd to an impalpable powder, two *ox galls*, one ounce of *gum tragacanth*; let them dissolve a proper time, and then put in a proper quantity of dry *alder-bark* powdered, two pound of *vitriol*, and twelve ounces of filings of iron; then pour off the water as above, and let them boil together two hours; after which, fill it up with half a pail full of barley or rather malt water, which is drawn off by brewers; let it boil again half an hour, then put in the *Silk*; let it boil gently for half an hour, then take it out and rinse it in a copper full of water, and throw it again into the dye; and afterwards when you take it out, rinse it pure clean in river water; hang it up in the air to dye, then put it into the dye again, and boil it gently for half an hour as before; rinse it also in the copper as before, and afterwards in  
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river water, and when it is dry, take good lye, and add to it the eighth part of a pound of good pot-ashes, rinse the *Silk* very well in this liquor, and lastly in river water, then dry it, &c.

This dye will also dye all sorts of woollen stuffs.

*An additional improvement to the former dye.* Having dy'd the *Silks Black* as above, then take *sal armoniack* and *antimony* powdered two ounces, filings of iron two handfuls; put them together in a copper, that has been drawn off, and hath been us'd before; make it so hot that you cannot bear your hand in it, that this compound help to the dye may the better penetrate.

Then take the *Black Silk* having been well dry'd and put it into the copper; let it lie there for an hour till it is thoroughly moistened, then draw it through water in which a proper quantity of *gum tragacanth* has been dissolv'd, taking care that it be thoroughly wetted, then dry it as usual.

*To give a lustre to Black Silks.* After the *Silk* has been dy'd, for every pound of it take an ounce of ising-glass, which steep in water and pass the *Silk* through the liquor, and it will be of a very beautiful lustre.

*To dye SILK of a very fine BLACK.* Take a copper of a tun of water, put in three quarters of a sack of bark, three pound of *Provence* wood, three pound of *sumach*, boil them for two hours, then strain them into a fat, throw away the dregs and fill up the copper again; and then add seven pound and a half of beaten galls, half a pound of *agaric*, and a pound and half of *pomegranate* shells, a pound of *calamus*, a pound and half of *fenna* leaves, a pound of *gentian*, and the same quantity of *marjoram*; boil all these together for two hours, strain the liquor through a sieve into the other dye, and let it digest for four days, stirring it often, and then put it into the copper in which you intend to dye; make a fire under it, and when it is hot, put in a pail full of lye, and boil all together very well, and when this is done, add half a pound of antimony, two pound of honey, a quarter of a pound of *borax*, half a pound of *litharge* of *silver*, and a quarter of a pound of *litharge* of *gold*, and half a pound of *verdegrease*; beat these together and put them into the kettle, and when the dye is warm, throw in fifteen pound of locksmith's filings, ten pound of gum, and ten pound of copperas, and let these ingredients stand to settle eight days, stirring it, as occasion requires; and after this you may dye with it, first putting in a pint of brandy.

*A receipt to make a dye good.* When it shall happen that the dye begins to work off, you ought to consider what time of the month it was made, and what time work'd; then put three pailfuls of water into a kettle, and add to it two ounces of *borax*, half a pound of *agaric*, and a quarter of a pound of *litharge* of *silver*; four ounces of *madder*, half a pint of *brandy*, and a quarter



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quarter of a pound of *verdegreafe* ; boil these all together for an hour, and then put them into the dye, and let it stand to settle for a fortnight, stirring it often.

Then make a liquor of two pound of *senna* leaves, two pound of *gentian*, one pound of *agaric*, two *pomegranate* shells, boil them together for two hours, and then pour them into the dye ; when this has been done the dye will remain good for a hundred years ; and the longer you dye with it, it will yield the finer *Black* colour ; but then particular care must be taken that no foot get into it, for that will spoil it past all help.

But if any grease or tallow happens to fall into the dye, let it cool and take it clean out, and if you cannot see it, make the ladle red hot and stir the dye about, and that will consume or burn up any greasiness ; also fill two or three canvas bags with bran, and hang them in the dye while it is hot, and let it continue two or three hours, then take out the bags, and cover the dye with brown paper ; and that will attract all the greasiness of it.

But when the dye begins to decay, whenever you dye, you must strengthen and refresh it in the morning with six pound of *gum*, six pound of *copperas*, four pound of filings, and a quarter of a pail of lye, then dye with it three days, six pound of *Silk* at a time.

When the *Silk* is dy'd it must be boil'd, and galled as follows :

To every pound of *Silk* take twelve ounces of galls, and boil them two hours, then wring the *Silk* ; and lay it in the liquor for two nights and a day.

*A BLACK dye for re-dying hats or any thing that has lost its Black colour.* Take half a pound of blue *Provence* wood, boil it in a pint of strong beer, till half of it be consumed ; then add half a pound of *vitriol*, and an ounce of *verdegreafe*, then take out the wood, and put in a quarter of an ounce of *gum tragacanth* ; let it stand, and when you have occasion to use it, dye a little brush in it, and so streak it over the *Hat* wool or silk, and it will give a fine lasting *Black*.

**BLACKNESS**, is the quality of a *Black* body or a colour arising from such a texture, and situation of the superficial parts of the body, as does as it were deaden or rather absorb the light, falling on it without reflecting any or very little of it to the eye.

In which sense *Blackness* stands directly oppos'd to *whiteness*, which consists in such a texture of parts, as indifferently reflects all the rays thrown upon it, of what colour soever they be.

Sir *Isaac Newton* has shewn in his *opticks*, that for the production of *Black* colours, the corpuscles must be less than those  
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which inhibit any other colours; because where the sizes of the component particles are greater, there is too much light reflected to constitute this colour; but if there be a little less than is requisite to reflect the white, and the very faint blue of the first order, they will reflect so little light, as to appear intensely *Black*; and yet may, perhaps, reflect it variously to and fro within them so long, till it happen to be stifled and lost; by which means they will appear *Black*, in all positions of the eye, without any transparency.

And from hence it appears why fire, and putrefaction by dividing the particles of substances, turn them *Black*; why small quantities of *Black* substances impart their colour very freely, and intensely to other substances to which they are apply'd; the minute particles of these by reason of their very great number easily over-spreading the gross particles of others; hence also appears why glass ground very elaborately with sand on a copper plate till it be well polish'd makes the sand, together with what by rubbing is worn off from the glass and copper, become very *Black*; and why *Black* substances do soonest of all others become hot in the light of the sun, and burn (which effect may proceed partly from the multitude of refractions in a little room, and partly from the easy commotion of so very small particles;) and also why *Blacks* are usually a little inclin'd towards a bluish colour; for that they are so, may be seen by illuminating white paper by light reflecting from *Black* substances, where the paper will usually appear of a bluish white; and the reason is, that *Black* borders on the obscure blue of the first order of colours, and therefore reflects more rays of that colour than of any other.

It is necessary also to the production of *Blackness* in any bodies, that the rays be stopp'd, retain'd and lost in them; and these conceive heat (by means of a burning glass, &c.) more easily than other bodies; because the light that falls upon them is not reflected outwards, but enters the bodies, and is often reflected and refracted in them, till it be stifled and lost. See LIGHT and COLOUR.

### *Observations on BLACK Colours.*

*Lamp Black*, } is the most us'd, because it is the easiest to be  
*Printer's Black*, } had, and is good in washing.

But you must never put *Black* upon other colours, to darken them, for it will make them dirty, nor shadow with *Black*, unless it be *Spanish brown*, when you would colour an old man's gown, which ought to be done of a sad colour; all other colours shadowed with *Black* look dirtily, not bright, fair or beautiful.

*Ivory Black*, is the deepest *Black* that is, and is thus made ; take *Ivory* in pieces, put it into a furnace till it be thoroughly burnt, then take it out and let it cool ; pare off the outside and take the blackest in the middle.

**BLANCHING** in *Coining*, is the preparation, that is given the pieces before they are struck, to give them the lustre and brilliant.

The ancient method of *Blanching* was by first heating the pieces, and then putting them into a large vessel of common water, and some ounces of *aqua fortis* ; but in different proportions for gold and silver.

This method is now disus'd, partly by reason of its expensiveness, and partly because it diminishes the weight of the metal.

*Blanching*, as it is now practis'd, is perform'd by heating the pieces on a kind of peel with a wood fire, in the manner of a reverberatory ; so that the flame passes over the peel.

The pieces having been sufficiently heated and cool'd again, are put successively to boil on two other peels of copper, in which are *aqua fortis*, common salt and tartar of *Montpelier* ; after they have been well drain'd of this first water in a copper sieve, sand and fresh water is thrown over them, and when they are dry they are well rubb'd.

**BLEACHING**, is the art or method of *whitening* linens, **BLANCHING**, stuffs, silks, &c. and is as follows.

For *Bleaching fine linens*. When they come from the loom, and while they are yet raw, they are to be steep'd a day in clear water, wash'd out and clear'd of their filth, and then thrown into the bucking tub, fill'd with a cold lixivium or lye.

When these are taken out of the lie, they are to be wash'd in fair water, then spread in a meadow, frequently watered from little dikes or canals interspers'd in the ground, by means of scoops or a sort of long hollow shovels, call'd by the *Dutch*, who invented them, *gieter*.

After the linen has lain a certain time on the ground, and every thing has been repeated as before, it is to be pass'd thro' a new lie pour'd on hot, and again wash'd in clear water, and laid a second time on the ground ; and then pass'd thro' a soft gentle lie, to dispose it to resume the softness, which the other sharper lies had taken from it, then wash'd in clear water, soap'd with black soap, and that soap is to be wash'd out again in clear water ; then it is to be steep'd in cows milk, the cream having been first skimm'd off, which finishes the *whitening* ; and scowring gives it a softness and makes it cast a little nap ; when it is taken out of the mill, it is wash'd in clear water for the last time.

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After all this process, they give the linen its first blue by passing it through a water, wherein a little starch, pale, smalt, and *Dutch lapis* have been steep'd.

In the last place, the proper stiffness and lustre is given with starch, pale, smalt and other gums, the quantity and quality of which may be adjusted according to occasion.

The whole process of *Bleaching* is finish'd in fine weather in a month's time; in ill weather, it takes up six weeks or more.

To BLEACH *coarse linens*, they are taken from the loom and laid in wooden frames, full of cold water, where they are so beaten by wooden hammers work'd by a water-mill, as to be insensibly wash'd and purg'd from their filth; then they are to be spread upon the ground in order to receive the dew for eight days, which will take off more of the rawness: then they are to be put into a kind of wooden tubs or pans, with hot lye pour'd over them.

Having been thus lixiviated, they are again purg'd in the mill, then laid on the ground again for eight days more, then they are to be pass'd through a second lye; and all things repeated, till such time as they have acquir'd their just degree of *whiteness*.

BLEACHING *woollen stuffs*. There are three manners of whitening woollen stuffs; the first is with water and soap, the second is with vapour of sulphur, the third with chalk, indigo and vapour of sulphur.

For the first, when the stuffs are come from the fulling mill, they are to be put into soap'd water, pretty hot, and work'd afresh by force of arms over a bench, which finishes the whitening which the fulling mill had begun; in the last place, they are to be wash'd out in fair water and dried; this is call'd the natural way of *Bleaching*.

The second method is what is commonly call'd *Bleaching by the flower*, thus; the stuff is first wash'd in river water, and then put to dry on poles, and when it is half dry, spread out in a kind of stove wherein sulphur is burnt, the vapour of which diffusing itself, sticks by little and little over all the stuffs, and gives it a fine *whitening*.

The third method is thus; after the stuffs have been wash'd, they are to be thrown into cold water, impregnated with *chalk* and *indigo*, in which they are well agitated; they are wash'd afresh in elder water, then half dried on poles, and then spread in a stove to receive the vapour of the sulphur, which finishes the *Bleaching*.

This method of *Bleaching* is agreeable enough to the sight, yet is not esteem'd the best method of *Bleaching*.

This is to be remembred, that when a stuff has once receiv'd the steam of sulphur, it will scarce receive any beautiful dye, except black and blue.

BLEACHING

**BLEACHING of Silk.** The *Silk* being yet raw, is put into a linen bag, and thrown into a vessel of boiling river water, in which soap has been dissolv'd, and thus boil'd for two or three hours; the bag being turn'd several times, taken out and beaten, then wash'd out in cold water, and wrung out slightly, and thrown into a vessel of cold water, mixt with soap and a little indigo.

The indigo gives it the bluish cast that is observable in white *Silks*.

When it has been taken out of the second vessel, it is wrung out, and all the water and soap squeez'd out, shook out to untwist and separate the threads, and hung up in the air in a kind of stove made on purpose, in which sulphur is burnt, the vapour of which gives the last degree of whiteness to the *Silk*.

**BLEACHING HAIR,** is done by spreading the hair to be bleach'd upon the grass, after the same manner as linen, after it has been first wash'd out in a lixivious water.

This lye with the force of the sun and air brings the hair to so perfect a whiteness, that the most experienc'd person may be deceiv'd therein; there being scarce any way of detecting the artifice, but by boiling and drying it; which leaves the hair of the colour of a dead walnut tree leaf.

There is also a method of dying hair with *bismuth*, which renders white hair, which borders too much upon the yellow of a bright silver colour. This also may be prov'd by boiling; the *bismuth* not being able to stand it.

**BLINDNESS** of mind, is represented in painting by a lady cloth'd in green, standing in a meadow, full of various flowers, her head inclin'd, and a mole by her side.

The *mole* is an emblem of *Blindness*: her head inclin'd towards fading flowers, signifies worldly delights, which allure and busy the mind to no purpose; for that whatever the flattering world promises, yet all is but a clod of earth, cover'd not only under the false hope of short pleasures; but with many dangers all our days.

**M** **MICHAEL LE BLON** of *Franckfort*, us'd this mark; he died in *Amsterdam* in the year 1650.

*To dye an Ox-BLOOD colour.* First tinge the stuff yellow, with a quartern and a half of *madder* to a pound of woollen stuffs, alum them and work them till they are of as beautiful a colour, as you would have them, then rinse them well out, and put into the kettle a tub of stale urine, and boil it again, till they take the dye; then roll the stuffs three or four times thro' it, and rinse them very clean.

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*To dye SILK a BLOOD colour.* Soak the *Silk* as before directed, and for each pound of it take half a pound of *allum*, and a quarter of a pound of *tartar*, beat them small and boil them in the quantity of a pail full of prepar'd liquor for a quarter of an hour; then put in the *Silk* and let it steep for two hours; then take it out, rinse it and beat it on a block, and hang it up to dry.

Then put four ounces of galls powder'd into the quantity of a pail of water, set it on the fire, till it is just so warm as you can bear your hand in it, then put in the *Silk*, and let it lie for two hours; then take it out and dry it.

This being done, put a pound and half of *brafile* in a linen bag, and put in with it some good wheaten bran water into a kettle, boil them together, being close cover'd; then take the kettle off the fire, and let it stand a whole night; then add a quarter of an ounce of *pot-ashes*, and boil it again for an hour; then pour on as much river water, as the liquor.

Then take out the bag of *brafile*, and put in the *Silk* after it has been a little scumm'd; cover the caldron very close, and let it remain there half an hour; then wring it out and rinse it very clean in river water; wring it out again, and hang it out again, and let it dry, and if it be not enough dyed, boil the dye again, and put in the *Silk* once more and clean it with soap, as in the crimson dye, and afterwards rinse it in the river water, and you will have a beautiful red.

BLUE is one of the primitive colours, otherwise call'd *Azure*.

Painters *Blue* is made different, according to the different kinds of painting.

In *limning*, *fresco*, and *miniature*, they use indifferently *ultramarine*, *blue ashes*, and *smalt*; these are their natural *Blues*, excepting the last, which is partly natural, and partly artificial.

In oil and miniature they also use indigo prepared: see **INDIGO**. As also a factitious **ULTRAMARINE**, which see.

Enamellers and painters upon glass have *Blues* proper to themselves, each preparing them after their own manner.

*Turnsole* BLUE is a *Blue* us'd in painting on wood, made of the seed of that plant. The way of preparing it is to boil four ounces of *Turnsole* in a pint and half of water, in which lime has been slack'd.

*Flanders* BLUE is a colour bordering on green, and seldom us'd but in landships.

*To write on paper or parchment with BLUE ink.* Grind *Blue* with honey, then temper it with glair of eggs or gum water made of ising-glass.

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**BLUEING** of *metals*, is perform'd by heating them in the fire till they assume a *Blue* colour ; particularly practis'd by gilders, who *blue* their metals before they apply the gold and silver leaf.

*To dye skins BLUE.* Boil elder-berries or dwarf-elder, then smear, and wash the skins therewith, and wring them out ; then boil the berries as before in a dissolution of alum water, and wet the skins in the same manner once or twice, dry them, and they will be very blue.

*Another way to dye skins BLUE.* Steep the best *indigo* in urine for a day, then boil it with alum, and it will be good ; or temper the *indigo* with red wine, and wash the skins therewith.

*The Prussian BLUE.* This *Blue* is next to *ultramarine* for beauty, if it be used in oil ; tho' I am not certain whether it will hold so well as the other, considering it has not the body of *ultramarine*.

This colour'd does not grind well in water ; because there is such an oily quality in it, that it does not mix kindly with water, and at the best will change, as it is now prepared in the common way.

Attempts have been made to make of it a blue ink ; which indeed has held the colour for a month or two, but then turn'd to a muddy yellow.

And when you put your pencil with gum water into a shell of this *Blue*, you will find where the water spreads, the *Blue* will change yellowish, till the body of the *Blue* is well stirred up.

And after all that can be done with this colour in water, it will only serve to shade *ultramarine* with ; but in oil it will serve very well for the present to supply the place of *ultramarine*.

**BLUE BICE** is a colour of a good brightness next to *Prussian Blue*, and also a colour of a body, and will flow pretty well in the pencil ; especially if it be well wash'd, as is directed to be done of the *whites* and *minium*.

*Saunders BLUE* is also of very good use, and may serve as a shade to *ultramarine*, or the *blue bice*, where the shades are not required to be very deep ; and is of it self a pleasant *Blue*, to be laid between the lights and shades of such a flower, as is of a *mazarine Blue*.

*A fine BLUE from Mr. Boyle.* Take the blue leaves of rue, and beat them a little in a stone mortar, with a wooden pestle ; then put them in water, juice and all, for fourteen days or more, washing them every day till they are rotten ; and at last beat them and the water together, till they become a pulp, and let them dry in the sun.



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This will produce as good a *Blue* as indigo, and be much softer; but in order to keep it a long time, when you beat it the last time, add to it a little powder of gum Arabick; of which you may put more or less, as you would have it more free or tenacious in the working.

This is a fine blue for shading, has a good body, and runs warm in the pencil.

**INDIGO BLUE.** This makes the strongest shade for *Blues* of any other, and is a soft warm colour, when it has been well ground and wash'd, with gum water, by means of a stone and muller.

It is made of what lightness you please, by putting more gum water to it; and by how much there is less, the darker it will be.

Before you use it upon a print, it will be proper to try it upon a *Dutch* tile, for it runs warmly in the pencil, and so perhaps may otherwise prove too strong for your design, which is always to be taken care of, when a flowing colour is to be laid over a dark shade of a print; which shade will much heighten its blackness, and even make it appear quite black.

**LACMUS or LITMUS BLUE.** This is a beautiful blue and will run in a pen as free as ink. It is made of *lacmus*, or as some call it *Litmus*, which may be had at the druggists.

But as this colour is never to be met with prepar'd, I shall here set down the method of preparing it.

Take an ounce of *Lacmus*, and boil it in about a pint of small beer wort, till the colour is as strong as you would have it; then pour off the liquor into a gallipot, and let it cool for use; it will soon become a jelly, and by degrees grow hard.

But this colour is to be opened again, and made liquid by water, so as to be us'd as ink; and will be either paler or darker, as it is made thicker or thinner.

This affords a bright colour, and has extraordinary effects; for it is not only a beautiful, but a holding colour.

This colour if it be touch'd with *aqua fortis*, immediately changes to a fine crimson, little inferior to carmine, and sinks quite through the paper, so as not to be got out.

So that when this colour is us'd as blue, it is best to preserve it from *aqua fortis*, or such strong acids.

It is a good shade for *ultramarine*, or *blue bice*, where the strongest shades should not be extremely deep; and for colouring of prints it is very good, as it is a transparent colour, and goes a great way.

*A transparent BLUE from Mr. Boyle equal to ultramarine.*

This is a beautiful *Blue*, and the chief ingredient of which it is made, is the *cyanus* or blue cornbottle flower, which abounds almost



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almost in every corn field, and may easily be had, during four of the summer months; and may be gathered by children about the skirts or verges of corn fields, without doing any damage to the corn.

This flower has two blues in it, one of a pale colour in the larger outward leaves, and the other of a deeper *Blue* that lies in the middle of the flower.

Both these will do, being separated from the buttons or cases, in which they grow; but the deep blue leaves in the middle produce by much the best colour; which may be observ'd by rubbing the leaves while they are fresh, so hard upon a piece of good writing paper, as to press out the juice, and it will yield an excellent colour, which will not fade, as has been found by the experience of two or three years.

This part of the flower is therefore the principal and what may be depended upon; which should be pick'd from the rest of the flower leaves, the same day, if it may be, or the next, or as soon as possibly can be.

A good quantity of these middle leaves being procur'd, press out what juice you can from them, and add to it a little alum, and you will have a lasting, transparent *Blue*, of as bright a staining colour as can be desired, scarce inferior in beauty to *ultramarine*, and is durable.

As for the outward flower leaves which are paler, it is not certain that they will answer the end; but upon some trials being made, that may also be known.

Let the flowers be gathered about the beginning of *June*, or in *July* or *August*, and some may be found in *May*; but the preparation of the colour by picking out the middle deep blue flower leaves, and pressing out the juice, must be press'd out with all the expedition possible, or they will lose their perfections.

It is very probable, that if the chives of these blue corn-bottle flowers were cur'd in the same manner as saffron is, they would produce a much greater body of colour, from which a tincture might be drawn with more ease, than if pressed raw or fresh from the field.

In order to do this, such a kiln should be prepar'd as is us'd for curing of saffron, in which may be made a small charcoal fire, which will communicate an heat to the top of the kiln, which is to be covered with an hair cloth; upon which should be laid four or five sheets of white paper, such as is us'd in curing of saffron; then a parcel of the picked flowers are to be laid on to the thickness of two or three inches, laying close and flat with a knife, and sprinkling with some thin gum water; then the cake of flowers is to be covered with two or three more sheets of paper and a board with a small weight laid on for a few minutes; after

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which the board is to be taken off, and the cake of flowers to be turn'd upon the kiln, taking hold of all the papers with both hands; and when it has been rightly plac'd, take off the upper papers, and sprinkle the cake again with some thin gum water; and then settling the cake of flowers again with a knife, let the papers be laid on again with the board and weight for a minute or two, and then let the papers be turn'd again and again, till the cake of flowers becomes united, and of the thickness of a cake of saffron.

In this operation, you will find the flowers to grow darker and darker every time they are turned, till at length the cake will look of a deep *Blue* tending to black. From whence a tincture may be easily drawn.

During this operation, great care must be taken that the fire does not scorch the flowers; but that it be as constant and gentle as may be, which will be a sure way to bring the flower cake to a good colour.

But it will not be improper for any person, who shall undertake the curing of this colour, to consult the methods of curing saffron, of which they may be inform'd, either by a treatise of the method of curing saffron, written by Dr. *Dowglass*, or another by Mr. *Bradley* in his monthly treatise of husbandry and gardening.

If it should be objected, that it will be troublesome to make this **BLUE COLOUR**; let it be considered what pains and nicety there is in gathering and curing of saffron; which is sometimes sold at thirty shillings *per* pound, and seldom comes up to three pounds *per* pound. But this *Blue*, if it comes up to the colour of *ultramarine*, will be worth four or five pounds *per* ounce, especially when it stains so well as this does.

Therefore it would, in all probability, be worth the while to have a piece of ground on purpose for this use, where nothing else but this *cyanus* or corn-bottle should be sown; and whereas this flower is said to be plentiful enough in the fields between *Twickenham* and *Teddington* in *Middlesex*, so there might easily be seed enough procured for that purpose in half an hour's time to sow an hundred acres.

As to the manner of cultivating this plant, every knob or head of seed must be opened before it is sown, for each head contains a great number of seeds; as for the preparing of the ground to receive this seed, there need to be no more trouble and expence than common plowing requires; which being done, the seed is to be sown either at the latter end of *August*, which will come up soon enough to stand the winter, and blossom early the *May* following; or else it may be sown at the end of *March*, and it will begin flowering the *June* following.

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At either of these seasons, after the ground has been well plough'd, harrow it in with bushes, and it will come up in a little time.

As to the choice of this seed, it will be necessary that it be gathered only in such fields, where you are sure there grows no *corn-bottles* of any other colour but *blue*; and then all the plants which rise from such seed, would produce *Blue*; but if they should be gathered in such places where there are varieties of them, then various sorts are to be expected, as white, red, or purple, altho' we are sure we gather the seed from such as were truly of a *blue* sort; for if there is a red flower of the same tribe growing near it, the difference of the colour will be so intermixt between both, that the seed of both will bring a variety from the principal, depending on the colours of both.

### *Observations on BLUE Colours.*

*Blue-Bice*, is the most excellent blue next to *ultramarine*, and may serve instead of it.

It is too good a colour to use upon all occasions, and *smalt* may be us'd instead of it for more ordinary uses, but it will not work so well as *Bice*; therefore when you design to bestow some cost and pains upon a piece, you may use *Bice*, otherwise you need not use any other than *blue-verditer*; with which you may make a pretty good shift in ordinary works, although you should have no other *Blue*.

*Indigo* is a dark *Blue*, and principally us'd to shadow upon other *Blues*. It makes a dark green, being mixt with yellow berries, to shadow other *greens* with in the darkest places.

*Blue Verditer*. It is a very bright pleasant *blue*, and the easiest to work with in water; it is somewhat inclining to a *green*, and the *blue* which is most of all us'd mix'd with yellow berries; it makes a good *green*.

*The method of making a vat, and preparing hot suds for dying linen and woollen BLUE.* Have a vat made big enough to contain eight pails of water, wide at the top, and narrow at the bottom; season it for a day and night with hot water, and afterwards wash it out with cold, then cut a four-square hole at about the height of twenty one inches, and fourteen broad; and have a copper plate made of the same thickness with the wood of the *vat*; nail this upon the hole, placing the nails at the distance of the breadth of two fingers one from the other; the nails must be small with broad heads to prevent its leaking; then place an iron hoop at the top and another at the bottom of the copper.

The hole must be made about a hand's breadth from the bottom of the vat.

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When this has been done, plaister or brick it about, either leaving or making a hole in the plaister or brick-work, wider at the utmost end (and a little) narrower at that which comes to the copper itself; the shape of it being like an oven's mouth, that the wood be not injured, when the fire to heat the vat of suds is put into this vacancy.

Then for every half pound of *indigo*, you put in, in order to *blue* linen or woollen, take in eight pails of water, and into that six handfuls of coarse wheaten bran, six or nine ounces of madder, a pound and half of pot ashes; pour them all into a copper to make suds, and when the liquor boils so as to begin to swell and bubble up, throw in two or three quarts of cold water, and rake out the fire from under the copper.

Then having ready lime, prepar'd as the tanners use it, plaister the inside of the empty vat with a handful or two of it, and afterwards pour all the ingredients out of the kettle into it, and cover it very close.

The day before you do this, you must put your indigo to dissolve in a quart or three pints of water in a clean vessel of iron or brass, adding half a handful of wheaten bran, and half a ladle full of *madder*, and half an ounce of pot-ashes, and leave it a whole night over a coal fire; but it must not be suffered to boil, or grow hotter, than you can bear your hand in it.

You must also grind it with a pestle, till it becomes as soft as pap, and is quite cleared of all roughness or harshness; which being done, it is fit to be put into the vat to the other ingredients.

Then stir it about three or four times with a stick; then cover it up close, and let it stand to settle twelve hours; then take off the cover, and put in half a quarter of an ounce of quick silver, and stir it about and cover it as before; then let it stand to settle for six hours; after which, throw in a small ladle full of *lime dust* or powder, or of the same that you before plaistered the vat with; then cover it close again, and let it stand for three hours longer, and then put in half an ounce of *pot-ashes*; stir it well about again, and put a coal fire in the hole before the copper plate in order to keep it warm, and let it stand three hours longer; after which, nothing is to be added, only stir it as before, and in an hour or two after you may dye with it as follows.

Hang five pieces of goods in it, keeping the bran and flour, &c. from it with your hand, to prevent its touching the linen as much as possible; wring the five pieces out one against another, then try by feeling with your finger, whether the dye be harsh, or soft and smooth, if it feels too rough, throw in half an ounce of pot ashes; and if it be too smooth, add half a ladle full of lime.

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Work the cloth or linen in it for two hours, put in five fresh pieces, and work them like the former, and when they are dry, wring them a second or third time in the dye, till they become of a colour as deep as you would have them.

Your dye may be wrought in this manner, till you have dyed thirty pieces, and afterwards if you would dye any woollen ware, stockings or yarn, take a couple of pails full of water, into which put two handfuls of wheaten bran, and an ounce of *madder*, and a quarter of a pound of *pot-ashes*, and hang it over the fire and boil it to the suds as before; then put it into the vat, and after you have stir'd it well about, let it stand to settle three hours.

Then try with your finger whether it is harsh or smooth; if it be too harsh, add half an ounce of *pot-ashes*, and if too smooth, add half a ladle full of lime, and stir it about again.

If you would dye woollen ware alone, without linen, prepare a liquor of a sufficient quantity of hot water, a handful of *madder*, and a handful or two of wheaten bran, boil them together, and wet the filken or woollen manufactures therein, hang them up and let them drop as long as they will; then put them into the abovementioned dye vat, letting them lie there till they are ting'd of as deep a colour as you would have them.

If you would dye your wares green, they must be first dyed yellow with *broom* or *dyers weed*, call'd also *yellow weed*, and then put into the beforementioned blue vat; but you must take notice that they must not be wetted in *madder* water, as the blue, and must be taken out of the vat as soon as they are dyed enough.

But you must be sure not to dye above half a dozen pair of stockings, or a proportionate quantity of other woollen ware, before you put in your linen, which must be covered close for half an hour, as soon as they have been put into the vat; then they must be wrung well about, then it must be let settle again, and wrung out again, and afterwards draw them out.

Then stir the dye again very well, and add a little lime or pot ashes, according as either of them is wanted, and after that let it stand to settle for two hours, and then put in other goods to dye, which work as before, stirring it every two hours.

If you find the liquor does not dye or work well, let it rest a day and night, keeping the fire to it all the while, and add half an ounce of *fœnugreek* powdered, and stir it well about, and the dye will come to itself again.

If you have so many things to be dyed, that you have occasion to augment the quantity of indigo to two or three pound, yet you need not make your *madder*, *pot-ash* and *bran-liquor* stronger than double the quantity of what is above prescribed for half a pound,

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*A BLUE Dye for SILK.* Procure a tub that may be close covered, put into it a lye made of three pailfuls of river or rain water and clean *beech ashes*, put in also two handfuls of *wheaten bran*, two ounces of *madder*, two ounces of white wine *tartar*, beaten to powder, one pound of *pot-ashes*, half a pound of *indigo* pounded small; stir it very well with a stick every twelve hours for fourteen days, till it tinges a sort of *green*, and when the dye is grown bright, it must be stirr'd every morning. Put the silk into a warm fresh lye, wring it out and stir it about in the dye some time afterwards, letting it hang in the dye, according to the custom of dying; and besides the blue copper, there ought to be another copper full of lye, that when the silk is wrung out of the dye, it may be rinsed in it; and after it has been wrung very clean out of that, rinse it again in river water, beat it and dry it.

If the silk be moistened in this latter lye or suds, before it is dyed, there is no need of the first above-mentioned lye.

Several sorts of *Blue* may be made with this dye, either brighter or darker at pleasure, according to the time they are left in it, and when the copper grows low, you may fill it up again out of the rinsing fat; but when the blue copper or fat grows weak, then put in a quarter of a pound of pounded *indigo*, and half a pound of *pot ashes*, half an ounce of *madder*, an handful of *wheaten bran*, and a quarter of an ounce of *tartar* pounded, and let it stand eight days without using it, stirring it every twelve hours, and then you may dye with it again as before.

*How to prepare a BLUE dye.* Put a pailful of water into a kettle that will hold it, hang it over the fire; put in a handful of unslack'd lime, two pound of *indigo*, one pound of *pot ashes*, and let them boil together for an hour, letting them dissolve.

Then having made clean a copper that will hold a tun of water, put into it two pound of *madder*, two pound of *bran*, and two pound of *pot ashes*; boil them a little, and let them settle, and pour the *indigo* upon them; then strain the lye also into the fat, but the *indigo* especially must be digested very well, and dissolved, and the copper fill'd with water, covered close, and a fire made under it; suffer it to grow warm, but not hot, stirring it about every two hours till it ferments, and as soon as it begins to melt or digest, it will also begin to turn yellowish, and then you may dye with it, taking care that your hands are very clean, and free from all sorts of grease.

When you have dy'd with the suds, you must strengthen them afresh with *pot-ashes*; but you must take care to do this neither too much nor too little; for if you are guilty of either extreme, the whole copper full of lye is spoil'd.

Neither



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Neither ought you to dye too often at one time ; but betwixt every time you dye, the liquor must be very well stirred.

*An excellent liquor to make the blue suds work, in case it happens that they will not, by reason of some defect.* Take four ounces of *madder*, four ounces of *pot ashes*, and two handfuls of *bran*; boil them together, and pour the liquor into the *blue suds*; stir it well about, and it will make it work; and if it be too much fattened with ashes, then hang a bag of wheat flour in it, and that will attract all the fatness to it; and if it be yet defective in any particular, add to it a small quantity of *salt-petre*, and that will bring it to a fermentation, as will also a little *grounds of beer*, which indeed is one of the best remedies.

*To dye Blue.* You must first boil, beat and rinse the silk, and prepare it while it is white without *alum*; then boil it in the blue suds, and wring it out, and dry it, after the same manner as you do greens.

**BLUE JAPAN.** Take gum water, what quantity you please, and white lead a sufficient quantity, grind them well upon a porphyry. Then take ising-glass size what quantity you please, of the finest and best smalt a sufficient quantity, mix them well; to which add of your white lead before ground so much as may give it a sufficient body; mix these together to the consistence of paint.

With this mixture do over your work, and repeat this three or four times, till you see your *Blue* lies with a good fair body, letting it dry thoroughly between each time; if the blue be too pale, put in more *smalt* into the size, without any white lead.

Then rush it very smooth, and go over it again with a stronger blue; and when it is thoroughly dry, wash it twice over with the clearest ising-glass size alone; then cover it, and let it dry two days.

Then warm the piece gently before the fire, and with a clean pencil, wash your work over with the finest white varnish, repeating it seven or eight times, and then let it dry two days as before; then repeat again the second and third time, your washes seven or eight times in like manner.

Then let it stand to dry for a week, and then polish it as before directed; and lastly to give it a polish'd and gloss'd appearance clear it up with *lamp black and oil*.

You may make the colour either light or deep according to your fancy; if it have but a small proportion of the lead, it will be deep; but if it has a larger, it will be lighter.

Also the size for laying *blues*, *white*, or any other colour, ought not to be too strong, rather weaker, and just sufficient to bind the colours to make them stick on the work; for if it be

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be too stiff, it will be apt to crack and fly off; and the reason of washing twice with clear size, is to keep the varnish from sinking into or tarnishing the colours.

*A BLUE for painting or staining glass.* Take of fine white sand twelve ounces, *zaffer* and *minium* of each three ounces; reduce them to a fine powder in a bell-metal mortar; then put this powder into a very strong crucible, cover it and lute it well, and being dry, calcine over a quick fire for an hour; then take out the matter, and pound it well in the mortar as before; then to sixteen ounces of this powder add fourteen ounces of nitre powdered, mix them well together, and put them into the crucible again, cover and lute it, and calcine for two hours in a very strong fire.

Take it out and grind it as before, then add to it a sixth part of nitre, and calcine again as before for three hours more; then take out the matter with an iron spatula red hot, lest it should stick; it being very clammy, and not easily emptied.

BLUE of the dyers is one of their simple or mother colours, which is us'd in the composition of others. It is made of woad, indigo, and a pastel brought from *Normandy*, and of the three the pastel is esteem'd the best and most necessary; woad, though of less force and effect, yet makes a tolerable colour, indigo only makes a spurious colour; yet it may be us'd along with pastel if it be well prepared, and be not mixt in too great a proportion.

Woad, having but little substance, can neither be us'd alone, nor is it capable of correcting the indigo without the assistance of pastel.

Some dyers heighten their *blue* by adding *brazile* and other woods.

The way of brightning *blues* is by passing the stuff, when dyed and well wash'd through lukewarm water, or which is much better, by working and fulling the dyed stuff with melted soap, and then scouring it well.

BLUES are immediately dyed from the whites, without any other preparation than fulling.

### *Of dying* BLUES.

*To dye a Blue or sky colour.* Take a sufficient quantity of urine, and four ounces of *indigo*, pound it to powder, and then dissolve it in the urine by a gentle heat, being close covered; then try its strength with a little bit of wool or flannel, and if it does not dye well, let it stand longer, until it is of a good colour.

It will be greenish at first, but will turn *blue* afterwards; before you put in your wool, yarn, flannel, &c. put a pint of  
yeast



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yeast into your liquor, and it will make the dye the better ; the less *indigo* is put into the liquor, the better sky colour it will be, provided it be not too little.

II. *To dye an excellent Blue colour.* Take of stale urine a sufficient quantity, and four ounces of rock *indigo*, set them to soak in a good heat, till the *indigo* is dissolv'd ; then put to it a pint of slack'd lime, and a pint of new yeast, mix them well together, and let them stand a quarter of an hour very hot ; then stir it, and enter twenty yards of broad-cloth, and handle it over and over, for the space of half an hour ; then cover it up for twelve hours, and then take it out and wash it. If it is not deep enough, heat the vat and put it in again.

III. *Another way of dying Blue.* Take a sufficient quantity of boiling water, put into it pot-ashes, one pound of *indigo*, two ounces of *madder*, four pints of wheat bran ; mix them all together and cover it for the space of twelve hours ; then open it and put in one pint of woad, stir it about very well and cover it up for an hour ; after which open it, stir it about, scum it and then put in your cloth, wool, &c.

This will dye about forty pound weight.

IV. *To dye another Blue colour.* Take a sufficient quantity of urine, make it hot, and put into it four ounces of *indigo*, finely powdered, half that quantity of *madder*, as much ground malt as *madder*, and a little yeast, two ounces of pot-ashes, cover it up and let it stand in the warmth of the fire, and try when it will make a good colour, and if it does, first wet the cloth in warm water, and keep the vat warm and work the cloth in it, till it is of a good *Blue*, taking care to stir it often that it may not spot ; keep it thus working till the dye is as deep as you would have it.

V. *To dye another Blue.* Steep *ebulus* or dwarf elder-berries being ripe and well dried, in vinegar for twelve hours, then rub them with your hands, and strain them through a linen cloth, putting thereto some bruised verditer and allum.

But take notice, that if you would have the *Blue* to be clear, you must put more verditer to it.

VI. *Another Blue dye.* Take tincture of brasile a sufficient quantity, vinegar three ounces, copper scales one ounce, salt one dram ; mix all in a copper vessel, in which put the matter to be dyed.

VII. *Another singular Blue dye.* Take of calcin'd tartar three pugils, of unslack'd lime one pugil, and with a sufficient quantity of water make a *lixivium*, and filter it ; put one pound of *Flanders Blue* to twelve or fifteen quarts of this *lixivium*, and mix them well together ; set it on the fire till it is so hot, that you can scarcely endure your hand in it ; then having first boil'd  
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(what you would dye) in alum water, take it out and dry it; afterwards dip it in hot lye twice or thrice, and put it into the dye again.

VIII. *To make a substantial Blue dye.* Take water a gallon, one pound of woad, infuse it in a scalding or almost boiling heat for twenty four hours; then put into it wool, cotton, stuffs, flannel, or cloth of a white colour.

IX. *Another good Blue.* Take a sufficient quantity, heat it in a copper, and dissolve in it half a pound of indigo, then put it into the vat, and add one ounce of madder, and a little ground malt; let it stand a while, and then enter twenty yards of cloth, working it till it is deep enough.

X. *Another fair Blue.* Take *sal armoniack* and quick lime, of each one pound, and two or three ounces of verditer, put all into a vial, and set it in a horse dunghil for forty days.

XI. *Another fair Blue colour.* Infuse some turnsole all night in urine, the next day grind it, and mix it with a little quick lime, according as you would have the colour to be; if you would have it a light shining colour, add to it a little gum Arabick.

XII. *To dye barley straw of a Blue colour.* Take a sufficient quantity of *lixivium* of pot-ashes, and a pound of *litmus* or log-wood ground, make a decoction; then put in your straw, and boil it and it will be blue.

*To make a fine BLUE staining water.* Make a weak *lixivium* of pot-ashes, or take lime water, and put into it a sufficient quantity of *florey*, and dissolve a little alum in it, and stir it well over the fire; then take it off, and throw wood ashes into it, and so you will have a fine blue.

*A weaker BLUE staining water.* Dissolve a sufficient quantity of *blue florey* in a sufficient quantity of water, and a little alum, and it will be of a fainter colour than the former.

*A staining BLUE water, weaker than the latter.* Take a quart of pure well water, two shells of *florey blue*; mix them well together, and lay them on thin. This will be the faintest of all the three.

*To dye wood, horns, or bones BLUE.* First boil them in alum water, then put them into a dissolution of *indigo* in urine.

*To dye bristles and feathers BLUE.* First boil them in alum water, and after, while they are warm, put them into a tincture of juice of elder berries.

*To make German BLUE.* Take *sal armoniack* two pounds, flowers of sulphur three quarters of a pound, quick lime half a pound; pound and grind them in an iron or marble mortar, till the mercury is wholly mortified and disappears; then put it into a glass body, well luted up to the middle; set it in a very gentle  
lime;

sand heat uncovered, till all the moisture is vanished. Stop it close, and increase the heat gradually, to make the mass sublime ; so will you have an excellent azure or *Blue*, which grind on a porphyry to a subtil powder for use in painting.

BLUENESS is the quality of any blue body ; or it is such a size and texture of the parts, which composes the surface of a body, as disposes them to reflect the *blue* or azure rays of light, and those only to the eye.

As for the *blueness* of the skies, Sir *Isaac Newton* observes, that all the vapours, when they begin to condense and coalesce into natural particles, become first of such a bigness as to reflect the *azure* rays, before they can constitute clouds or any other colour.

This therefore being the first colour they begin to reflect, must be that of the finest and most transparent skies, in which the vapours are not arriv'd to a grossness sufficient to reflect other colours.

M. *de la Hire*, and before him *Leonardo de Vinci* observes, that any *black* body, view'd thro' a thin *white* one, gives the sensation of *blue* ; and this he assigns as the reason of the *blueness* of the sky ; the immense depth whereof being wholly devoid of light, is view'd thro' the air, illuminated, and whiten'd by the Sun.

For the same reason, he adds, it is, that soot, mixt with a *white*, makes a *blue* ; for white bodies being always a little transparent, and mixing themselves with the *black* behind, give the perception of *blue*.

From the same principle, he accounts for the *blueness* of the veins on the surface of the skin, tho' the blood they are fill'd with be a deep red ; for he observes, that red, unless viewed in a strong clear light, appears a dark brown, bordering on black. Being then in a kind of obscurity, in the veins it must have the effect of a black ; and this view'd through the membrane of the veins and the white skin, will produce the perception of *blueness*.

B. M. VVV. signifies *Bernardo Malpucci* of *Mantua*, painter and engraver ; he engrav'd in wood with three tools ; with the first he made the profile, with the second the shadows, and with the third the light.

*Bol. inventor*

*Bonaso sc. 1545.*

} signifies *Julio Bonasoni* of *Bologna*.

BOASTING is represented by a woman making a great shew, covered with peacock's feathers ; with a trumpet in her left hand, and her right in the air.

The feathers denote *pride*, the mother of boasting ; the trumpet also intimates self-boasting, or sounding ones own fame,

being blown by ones own breath ; for *vain boasters* take delight in publishing their own actions.

BODY as to BEAR a BODY, a term us'd of painting colours, and signifies that the colours are of such a nature, as to be capable of being ground so fine, and mixing with the oil so intirely, as to seem only a very thick oil of the same colour.

Of this nature are white lead and cerufs, lamp-black, ivory black, vermilion, lake, pink, yellow oker, verdigrease, indigo, umber and *Spanish* brown.

Blue bice and red lead are not so fine, as they may be said to *bear a very good Body* ; but those before mentioned may be ground so fine, as to be like even oil itself ; and then they also may be said to work well, spreading so smooth, and covering the body of what you lay it upon so intirely, as that no part will remain visible, where the pencil hath gone, if the colour be work'd stiff enough.

Whereas on the contrary verditers, and smalts, with all the grinding possible to be given them, will never be well imbodyed with the oil, nor work well.

Indeed *bice* and *red-lead* will hardly grind to an oily fineness, nor lie intirely smooth in the working ; yet may be said to *bear an indifferent Body*, because they will cover such work very well that they are laid upon.

But such colours as are said *not to bear a Body*, will readily part with the oil, when laid on the work : so that when the colour shall be laid on a piece of work, there will be a separation, the colour in some parts, and the clear oil in others ; except they are tempered extraordinary thick.

EDWARD du BOIS was a history and landskip painter, but chiefly the latter, born at *Antwerp*. He was disciple to one *Groenwegen* a landskip painter ; likewise who resided many years in *England*, and had been some time in *Italy*. *Du Bois* also travelled to *Italy*, where he continued eight years, during all which time he studied the antiques, and painted after the *Italian* gusto jointly with his brother now living here.

He worked some time at *Paris*, and in his way to *Italy*, did several pieces for *Charles Emanuel Duke of Savoy*. Soon after his return to *Holland*, he came to *England*, and died in *London* about thirty three years ago, being seventy seven years old. He lies buried in *St. Giles's* church. He and his brother, by their extraordinary industry, have made one of the finest collections of closet pieces especially of any in *England*.

**R**ENE BOIVIN who engrav'd several plates of ancient foliages, us'd this mark.

BOLLITO,

**BOLLITO** a name by which the *Italians* call a sea green colour in artificial crystal.

This colour is not to be made without a great deal of precaution.

To succeed well, you must have in the furnace a pot fill'd with forty pound of good crystal frit, carefully skimm'd, boil'd and purified, without any *manganeze*.

Then you must have twelve ounces of the powder of small leaves of copper thrice calcin'd, as directed in the article **COPPER**. And half an ounce of *zaffer* in powder, prepar'd as directed in the article **ZAFFER**.

Mix these powders together, and put them at four times into the pot, that they may the better mix with the glass, stirring them well each time of putting in the powder, for fear it should swell too much and run over.

After the whole has been incorporated, well mix'd and pretty well settled for two hours, try if the colour is deep enough, if so, let it rest, though the sea green or sky colour seems at first greenish, you need not be concern'd at it; for the salt in the glass will consume all that greenness, and change it into blue.

After the metal has stood at rest for twenty four hours, it may be wrought, and you'll have the colour deeper or lighter, according to the quantity of powder you have put into it.

There is no other rule for that but the fancy of the workman, for which reason it cannot be ascertained; besides, the matter that is us'd for tinging glass, makes it have some more colour, some less, which proceeds from the preparation of it.

**B** SCHELDE A BOLSUVERT us'd this mark when he had not a mind to subscribe his name.

*To dye* BONES, HORNS, WOOD, &c.

*To dye* BONES GREEN. Put of filings of copper and verdegrease, of each three ounces, into a quart of white wine vinegar; add a handful of bruised rue, mix them well, and put the bones in this for fifteen days.

*To dye* BONES, HORNS, or WOOD *red*. First, let them be boil'd in alum water, then put them into a tincture of brazil in alum water for two or three weeks, or else into a tincture of brazil with milk.

*To dye them* BLUE. First boil them in alum water, then put them into a dissolution of indigo in urine.

*To dye them* GREEN *like emeralds*. Put as much filings of copper into *aqua fortis* as it will dissolve; then put in bones, horns, wood, and let them lie for one night.

# B O N

*To dye ELDER, BOX, MULBERRY, PEAR-TREE, NUT-TREE of the colour of EBONY.* Steep the woods in alum water for three or four days, then boil it in common oil, with a little *Roman vitriol* and *sulphur*.

*Where you are to take notice, that the longer you boil the wood, the blacker it will be; but too long boiling will make it brittle.*

*To dye Bones green.* First boil the bones in alum water, then take them out, dry them, and scrape them; then boil them in lime water, with a little *verdegreafe*.

*To dye Wood like ebony.* Distil an *aqua fortis* of salt petre and vitriol, and besmear the wood with it as oft as you see occasion.

*To make Horns black.* This may be done with vitriol dissolved in vinegar and spirit of wine; or with the snow white calx of silver in fair water.

*To make Bones white.* Boil them in water and lime, scumming it continually.

*To dye Bones black.* Take litharge and quick lime of each two pounds, put it into a sufficient quantity of water; put in the bones, and stir them with a stick till they boil apace. Then take it off the fire, and keep stirring till all is cold, and the bones will be very black.

*To soften Bones, Ivory, &c.* Lay them for twelve hours in *aqua fortis*, then three days in the juice of beets, and they will be tender, and you may make of them what you will. When you would harden them again, lay them in strong white wine vinegar.

*To dye Bone, Ivory, Horn, &c. black.* Put brass into *aqua fortis*, and let it stand till it is turn'd green, with which wash the Bone, Horn, &c. (it having been first polished) three times: then put them into a strong decoction of logwood in fair water whilst hot, letting them lye a little; which done, rush and polish it, and it will be as black, and have as good a gloss as japan or ebony.

*To dye Bones, Horn, &c. of a green colour.* First boil them in alum water, then take wine vinegar what quantity you please, *Spanish green* or common *verdegreafe* well ground a sufficient quantity, sal armoniac half the quantity of the *verdegreafe*; then put in the Bones, &c. and keep them gently boiling till they are sufficiently stain'd.

*To dye BONES, &c. of a red.* Mix a sufficient quantity of quick lime with what quantity of water you please, let it stand a night to dissolve, then decant off the clear water, straining it through a cloth. Take of this water eight pounds, put into it four ounces of brazil wood rasp'd, mix and boil them gently; (then having first boil'd the bones in alum water) put them in,  
and

## B O R

and boil them into the tincture of brazil till they are thoroughly red.

*To make a BLACK of burnt Bones.* Burnt ivory, or for want of that, burnt bones is the blackest black; and if you have not the conveniency of burning them in crucibles as is elsewhere directed, put them into the fire till they be thoroughly burnt; then take it out, and let it cool, and so slit it in the middle, and take out the blackest of it in the middle, and grind it for your use.

DANIEL BOON was a *Dutch* droll painter, and a great admirer of ugliness and grimace, both in his small and great pieces; in which he seldom forgot to endeavour to raise mirth in his countrymen and ours of the same sublime genius. He died lately.

**DB** DAVID VAN BOONS *Inv.* and after this mark we read *Oons*; his plates were engraven by *P. Servator, sc.*

BORAX is a mineral salt, us'd in *soldering, brazing, and casting* gold and other metals.

*Borax* is of two kinds, *natural* and *artificial*; the *natural* is also call'd crude, the artificial is that which is purified and refin'd.

The *natural Borax* is a mineral salt of the common form, dug out of the earth in several parts of *Persia*; and is found also at the bottom of a torrent, running in the mountains of *Purbeth*, near the frontiers of *White Tartary*. When it is taken up it is expos'd to the air, where it acquires a kind of reddish fat, which serves to feed it, and prevent its calcining.

When it is in its perfection, it is sent to *Amadabat* in the territories of the great *Mogul*, where the *European* merchants buy it.

There is another kind of artificial *Borax*, drier and of a greyish colour, like *English copperas*, only differing from the former by its being longer expos'd to the air.

The *Venetians* were the first who found out the art of preparing artificial *Borax*, or rather of purifying the natural. The method of doing it is by dissolving it in water, then filtrating and crystallizing it; using for that purpose matches of cotton, about which the *Borax* crystallizes, like sugar candy and verdegreafe on wood.

The *Dutch*, after they have refined it, reduce it into little pieces, like tagged points, and 'tis thus 'tis commonly used.

*Borax* refined, either after the *Venetian* or *Dutch* manner, should be clear and transparent, almost insipid to the taste; and above all, care must be taken that it have no mixture of *English* alum.




## B R A

PARIS BORDONE, born in the year 1512, or 1526, scholar of *Titian*, imitated *Giorgione*, liv'd at *Venice* and in *France*; excell'd in history and portraits, died aged seventy five years.

BOREAS, the north wind, is represented in painting like an old man with a horrible or terrible look; his hair and beard covered with snow, or the hoar-frost, with the feet and tail of a serpent.

FRANCIS BOROMEIO *da SAVIGNANO*, born in the year 1446, scholar to *Cosimo Rosselli*, and studied *Leonardo da Vinci*, liv'd at *Florence*. Excell'd in portraits and history painting, died in the year 1517, aged forty eight years.

 CORNELIUS BOSS, on a virgin engraven by him is this mark, and underneath *Michael Ang. inv. i. e. Buonaroti*.

BOUNTY is represented emblematically by a noble lady, cloath'd in a garment of sky colour, standing by an altar inflam'd, pressing the milk out of her breasts with both hands plentifully, of which several animals drink, and some upon the kindled altar. The squeezing of her breasts alludes to the bountifulness of her disposition, and some of it falling upon the flames of the altar, denote that *Bounty* ought to be shewn in imitation of God himself.

SEBASTIAN BOURDON, born in the year 1619, studied in *Rome*, liv'd at *Rome*, *Sweden*, and *Paris*; excell'd in history and portraits, died in the year 1690, aged seventy years.

B. P. signifies *Bartholomew Passorotto* of *Bononia*, a painter.

To make BRAN-WATER for preparing slight stuffs for dying. Put a hatfull of wheaten *Bran* into each pail of water, and boil them together for a quarter of an hour, then pour it into a clean tub, where to every two pailfulls of this liquor, pour in another pail of water, and throw on a handful of *leven*. The *French* dyers call these waters *eaux sures*, i. e. acid or sharp waters, and by how much they are the sower, account them so much the better, and fitter to attract the fatness of the stuffs, and dry it clean off, to make them limber, and correct the roughness of the water.

Cavalier GIACINTO BRANDI, born in the year 1623, a scholar of *Lanfranc*, liv'd in *Rome*, excell'd in history, died in the year 1691, aged sixty eight years.

BRASIL { a wood so call'd, because first brought from *Bra-BRAZIL Szil*, a province of *South America*. It has various names, according to the places it comes from. Thus we have *Brazil* of *Fernambouc*, *Brasil* of *Japan*, of *Lumon*, of *St. Martha*; and lastly *Brasilette*, brought from the *Antilles*.

The *Brazil*-tree commonly grows in dry, barren places, and in the middle of rocks; it is very thick and large, and usually crooked

crooked and knotty. Its flowers, which are of a beautiful red, exhale a very agreeable scent, good for comforting and strengthening the brain.

Though the tree be very thick, it is covered with so thick a bark, that when the savages have taken it off the wood, a trunk, which was before the thickness of a man, is scarce equal to that of his leg.

*Brazil* wood is very heavy, dry, crackles much in the fire, and scarce raises any smoke, by reason of its extreme dryness.

None of the several kinds have any pith, except that of *Japan*. That of *Fernambouc* is esteem'd the best.

It must be chosen in thick pieces, close, sound without any bark; and such as upon being split from pale, becomes reddish; and being chewed, has a sugary taste.

It is much us'd in dying, where it serves for a red colour, but it gives but a spurious colour, and easily evaporates and fades; nor is the wood to be us'd without alum and tartar. From the *Brazil* of *Fernambouc* is drawn a kind of *Carmin* by means of acids.

There is also a liquid *lacca* made of it for painting in miniature.

To make LAKE or Tincture of BRAZILE. The *Brazile* meant here is that which the dyers make use of. Take of the finest that comes from *Fernambouc*, that being the best.

The way of extracting this tincture is the same as that from *Kermes* (see KERMES) and may be effected two ways, either with the *menstruum* first prescrib'd, or with strong waters; only observe not to put so much *alum* to each ounce of *Brazile* as to the berries; for that tincture is deeper than this from *Brazile*, and consequently requires more stuff; therefore use only in this as much as you think reasonable, experience will be the best guide.

Take notice too, that when you do it by the first *menstruum*, there is a greater quantity required of *Brazile* than was prescrib'd of *Kermes-berries*, to each pound of shearings.

In every thing else follow the former directions, and you'll have a fine colour or lake less chargeable, and altogether as good as the tincture of *Kermes*, for painting.

BRASS, or as the *French* call it, *yellow copper*, is a factitious metal made of copper and *lapis calaminaris*.

The method of preparing it is as follows. The *lapis* having been calcin'd, and ground fine as flour, is mix'd with ground charcoal; and incorporated, by means of water, into a mass: this being done, about seven pounds of the *lapis calaminaris* is put into a melting-pot that will contain about a gallon; and over that about five pounds of *copper*; this pot is let down into

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a wind-furnace eight foot deep, where it remains for eleven hours, in which time it is converted into *brass*.

This metal then is cast either into plates or lumps; forty five pounds of crude *lapis calaminaris* or calamine, will produce thirty pounds when calcin'd or burnt.

Sometimes *brass-shruff* is us'd instead of copper; but that is not always to be procur'd in quantities sufficient, it being no other than a collection of old brass.

Pure brass is not malleable, unless when it is hot; for when it is cold, it will break. And after it has been melted twice, it will be no longer in a condition to bear the hammer at all; but in order to render it capable of being wrought, they put seven pounds of lead to a hundred pounds of brass, which renders it more soft and pliable.

The best proportion for gun-metal for casting great guns is said to be a thousand pounds of *copper*, nine hundred pounds of *tin*, and six hundred pounds of *brass* in eleven or twelve thousand weight of metal.

The best brass guns are made of malleable metal, not of pure copper and calamine alone; but coarser metals are us'd to make it run closer and sounder, as lead and pot-metal, which last is made of brass and lead; twenty pound of lead is usually put into a hundred pounds of pot metal.

*Corinthian BRASS* has been famous in antiquity, and is a mixture of gold, silver, and copper. *L. Mummius* having sack'd and burnt the city of *Corinth*, 146 years before our Saviour's time, there being there a vast number of statues, images, vessels, &c. of gold, silver, and copper, all these melted and run together by means of the violence of the conflagration; and this mixture was the composition call'd *Corinthian brass*. Those who peak of it accurately, distinguish it into three kinds; in the first, gold is the prevailing metal; in the second, silver; in the third, gold, silver, and copper are equally blended.

*To make BRASS.* Melt six pounds of copper with two pounds of *lapis calaminaris* in powder for the space of an hour, and then put it out.

*To cleanse BRASS.* Take *aqua fortis* and *water*, of each a like quantity; shake them together, and with a woollen rag dipt therein, rub it over; then presently rub it with an oily cloth: lastly, with a dry woollen cloth, dipt in *lapis calaminaris*, and it will be as clear and bright as when new.

*To purge BRASS.* It is cleansed or purged by casting into it while it is melted, broken glass, tartar, sal armoniack and salt petre, each of them by turns, a little and a little.

*To calcine BRASS, call'd Orpello or Tremolante, making a curious sea-green or sky-colour.* Take thin Brass, cut it into  
small

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small pieces, put it into a crucible covered and luted at top; set it in a fierce fire, where let it stand four days in a great (but not melting) fire, for if it melt, your labour is lost. In four days time it will be very well calcin'd; then powder'd as fine as you possibly can, searse it, and the powder will be black; spread this on tiles, and keep a leer on burning coals for four days, near to the round hole; take away the ashes that fall upon it, powder and searse it again, and then keep it close stopt for use.

To know if it be well calcin'd, put it into glass, and if it swells, 'tis right; if not, it is not well calcin'd, or else it is over burnt, and if so, it will not give a good colour.

*To calcine BRASS another way, to make a transparent RED.* Cut your thin pieces of brass small, and put it into a melting pot, with layers of powder of *brimstone*, and metal as in copper. Set it first on kindled coals, then put it into a strong fire in the furnace to calcine for twenty four hours; then beat it to a fine powder, and searse it; put it covered into the furnace on earthen tiles for twelve days, to reverberate; so powder, grind, and keep it for use.

Besides a *red*, it contributes principally to the making a yellow and *chalcedony*.

*A RED colour from BRASS.* Put small pieces of it into the arches of the furnace, and let them remain there close till they are well calcin'd; but in such a fire, that they may not melt; and when they are well calcin'd, powder the brass, and the powder will be red, and excellent in many uses for colouring glass.

Brass thrice calcin'd is likewise very excellent.

*To calcine BRASS thrice.* Put this into the *leer*, or into the *furnello* of the furnace, near the *occhio*, into pans baked or earthen tiles; calcine it for four days, and you will have a *black powder* sticking together; pound it fine, and searse it; then calcine it again as before, but a day longer, and then it will not stick together, and will be of a *ruffet* colour; and do so the third time, but take care that it be not calcin'd either too much or too little, for then it will not give a good colour.

To know if it be well calcin'd, put it to purified metal, and it will make it boil and swell; and if it does not, it is either too much or too little.

This makes a curious *sea-green*, and an *emerald-green*, a *turquois* or *sky colour*, and other varieties.

*BRASS to tinge of a gold colour.* Dissolve burnt brass in *aqua fortis* (made of *vitriol*, *salt-petre*, *alum*, *verdigrease* and *vermilion*) and then reduce it again, and it will be much of a gold colour.

*To make BRASS thorough white.* Heat brass red hot, and quench it in water distill'd from *sal armoniack* and egg shells ground together, and it will be very white. *Ano-*

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*Another way.* Calcine egg-shells in a crucible, and temper them with the whites of eggs; let it stand so three weeks; heat the brass red hot, and put this upon it.

*The way to colour BRASS white.* Dissolve two penny weight of silver in *aqua fortis*, setting it to the fire in a vessel till the silver turn to water; to which add as much powder of *white tartar* as may drink up all the water, make it into balls, with which rub any brass, and it will be as white as silver.

BRAZING is the foldering or joining two pieces of iron, &c. by means of thin plates of brass, melted between the two pieces to be joined.

If the work be very fine, as when the two leaves of broken saws are to be brazed or join'd together again, it is covered with powdered *Borax* moistened with water, that may incorporate with the *brass-dust*, which is added to it, and the piece is expos'd to the fire, without touching the coals, till the brass be observ'd to run.

But to *braze* with a still greater degree of delicacy, a folder is made of brass with a tenth part of *tin*; or another, one third brass and two thirds silver; or *borax* and *rosin*. But in all these manners of *brazing*, care must be taken that the pieces be join'd close throughout; the folder only holding in those places which touch.

**I G B** HANS BRESANK engrav'd the stories of the New Testament, and in the year 1619; the twelve Apostles, our Saviour, and *St. Paul*. He used this mark.

MATTHEW BRILL, born in the year 1550, liv'd at *Antwerp* and *Rome*, excell'd in history and landscapes, died in the year 1684, at thirty four years of age.

PAUL BRILL, born in the year 1554, imitated his brother *Matthew*, afterwards studied *Annibal Carrache*, and copied *Titian*, liv'd at *Rome*, excell'd in landscapes and history.

**S** I. G. BRONCHORTS in certain landscapes used this mark, in which we likewise find the letters C. P. i. e. *Cornelius Pulemburgh, pinxit.*

*To extract Lake from* BROOM FLOWERS. First make a *lixivium*, or *lye* of *soda* of the glass house, and fresh quick lime, which must be pretty strong, in which put in the *broom-flowers*, over a small fire, until all the tincture be drawn from them, the flowers become white, and the *lye* receive the yellow colour.

Then take out the flowers, and put the *lye* into a glaz'd earthen vessel to boil, adding thereto as much *rock-alum* as it can well dissolve; then take it off, and putting it into a large vessel, mix it with fair water, so the yellow will separate and descend to the bottom; let it rest there a little; and afterwards

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wards decant the water off gently, and so put in more fresh to it again and again, until the water has drawn off all the *salt* and *alum* from the *lixivium*, and it becomes clear.

Thus the colour will be very well cleans'd of the *salt* and *alum*, and remain exceeding fine and bright; spread it on pieces of white linen, and let it dry in the shade on new baked tiles, and you will have a most admirable *yellow* for painting.

ADRIAN BROWER, born in the year 1608, a scholar of *Frans Halls*, liv'd at *Antwerp*, excellent at boors and drolls, died in 1638, aged thirty years.

*Spanish BROWN* is a dark, dull red, of a horse flesh colour. It is an earth, and is dug out of the ground; but there is some of it of a colour pleasant enough to the eye, considering the deepness of it.

It is of great use among painters, being generally us'd as the first and priming colour, that they lay on upon any kind of timber work in house painting, &c. it being a colour that is cheap and plentiful, and works well, if it be ground fine; which may be done with much less labour than some better colours require.

That which is of the deepest colour is the best, and that which is the freest from stones.

Tho' the other sorts do not give so good a colour to the eye, yet they serve as well as any others for a priming colour, for the seasoning of the wood in order to lay other colours on.

Tho' this is a dirty brown colour, yet of great use, not to colour any garment with, unless it be an old man's gown; but to shadow vermilion, or to lay upon any dark ground behind a picture, or to shadow yellow berries in the darkest places, when you want lake, &c.

It is the best and brightest colour when it is burnt in the fire till it be red hot, tho' if you would colour any hare, horse, dog, or the like, it should not be burnt; but for other uses, it is best when it is burnt. As for instance, for colouring wood, posts, bodies of trees, or any thing else of wood, or any dark ground of a picture.

### *Observations on BROWN Colours.*

*Spanish Brown* is a dirty brown colour, but of great use; as also to shadow vermilion, or lay upon a dark ground behind a picture. You may shadow yellow berries with it in the darkest places, when you want lake or thick red-ink; but don't colour garments with it, unless it be old mens gowns.

*Umber* is a hair colour, and the best and brightest when it is calcin'd red hot; but it must not be burnt for colouring any hare, horse, dog, &c. but for other uses, it is best calcin'd or burnt; as for colouring posts, bodies of trees, timber-work, or any dark ground in a picture.

Use



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Use it not in garments, unless in old mens gowns or caps standing together, which are not to be all of the same colour. But for distinction's or variety's sake, you may use it unburnt in many cases.

I. *The method of dying BROWNS.* Take a sufficient quantity of water, put it into the copper, and put of red-wood ground and nut galls bruised, of each twenty ounces; boil them together, and enter twenty yards of broad-cloth, boiling it for two hours and a half, and keep cooling it with a cooler, for fear of spotting; then take it up and air it: then put in sixteen ounces of copperas, and enter the cloth again, when it is almost ready to boil again, and handle it, letting it boil half an hour, and then cool it. If you would have the colour sadder, put in more copperas.

II. *To dye a sad BROWN.* First, infuse the cloth or stuff to be dyed in a strong tincture of *hermodactyls*; then put saffron and ashes in a bag *stratum super stratum*, upon which put water two parts, mixed with vinegar one part; strain out the water and vinegar, being thoroughly hot, fifteen or sixteen times. In this lixivate tincture of saffron, put the former matter to be dyed, letting it lie a night; then take it out, and without wringing, hang it up to dry; repeat this working the second and third times.

III. *To dye a BROWN tawny, or iron rust colour.* Make a strong decoction of walnut-tree leaves in fair water; then put in the matter you would have dyed, and boil it some hours with the leaves in the said liquor, and when it comes out, it will be exactly of a tawny brown colour.

IV. *To make the colour call'd the London BROWN.* First dye twenty yards of cloth of a bright blue; then take stale, clear liquor made of wheat bran a sufficient quantity, a quarter of a pound of ground logwood, and of alum two pound and a half; mix and boil the cloth two hours and a half, and then cool it; afterwards take fresh liquor made of wheat bran and clear, to which put two pounds and a half of madder, and handle the cloth; let it have a quick fire to a boiling, then cool it; after which, take a sufficient quantity of fair water, half a pound of logwood, a quarter of a pound of brasil ground; then let them boil well, adding some urine; then enter the cloth, and handle it, and let it boil a quarter of an hour; cool it and wash it well.

V. *To dye woollen a clove BROWN.* Boil three pounds of alum, and two pounds of tartar in a copper; then put in the stuff, boil it two hours; then take it out, and put in together five pound of madder, and a pint of wheat-bran, stirring the liquor three quarters of an hour, till it is boiling hot; then draw off the water,



ter, putting in fresh water, and put in a pound of galls and the cloth, which boil for an hour; then take it out again, and put three pounds of *copperas* into the kettle, and then put in the stuff again, and stir it about till it is sufficiently dyed; then rinse it.

VI. *Another clove BROWN.* Heat some water with clear fine flour, and for every pound of stuff, put in two ounces of *alum*, one ounce of tartar in powder; boil them together, then put in the stuff, and stir it about for an hour; then cool and rinse it; then heat some fair water, and for every pound of stuff, take two ounces of *brasile*; boil it for half an hour, then put the rinsed stuff into it, and work it so long, till it is sufficiently tinged red; then take it out, and add to the dye an ounce of *vitriol*; dissolve it very well, then work the stuffs so long in it as you shall judge proper; then rinse it out.

VII. *Another BROWN colour.* Take as much water as will cover twenty eight pounds of wool, yarn, flannel or cloth; put it into a copper, to which put nut-galls bruised small two pounds, red-wood ground half a pound; then put in the matter to be dyed, let all boil together for three hours; then take out the cloth and air it; then put into the same liquor four pounds of *copperas*, let it melt; then enter the wool, cloth, &c. again, and boil it to deepen the colour to what degree you would have it.

VIII. *Another London BROWN.* To a sufficient quantity of water, put a pound of nut-galls bruised, red wood ground, madder and fustic of each half a pound; boil all together for an hour; then put in your cloth or other matter to be dyed, and let it boil an hour also; afterwards take it out and cool it; then put in two pounds of *copperas*, and when it is melted, put in the cloth again, and sadden it. This will dye twenty pound weight.

IX. *Another kind of BROWN.* Put a pound of nut-galls bruised small, two pounds and a half of red wood bruised to a sufficient quantity of water; let them boil for two hours; enter twenty yards of broad cloth, and sadden it at your pleasure.

X. *Another London BROWN.* To a pound and a half of red-wood ground, put a sufficient quantity of water, into which enter twenty yards of broad cloth; boil all together for an hour; take it forth and cool it, and put into the liquor wood-foot a sufficient quantity; and let the copper boil till the wood is dissolved; then put in the cloth, and boil it for an hour; take out the cloth and cool it; put in *copperas* a sufficient quantity; put in the cloth again, and sadden it as usual.

XI. *Another BROWN colour.* Put two pounds of madder, and a pound and a half of nut galls bruised, and three quarters of a pound of fustick, into a sufficient quantity of water; let them  
boil,

## B R U

boil, and then put in fifty pounds of wool, yarn, flannel or cloth; let it boil for two hours and a half; then cool it, and put in copperas two pounds, and boil to a sadness design'd.

XII. *To dye a lasting and neat purple* BROWN. First dye cloth (for slight stuffs will not bear the price of this dye) a blue, either light or dark, according as you would have the colour; then boil it first either with *galls* and *madder*, or with *galls* only; and after that with *copperas*.

When it has been well boil'd with *madder*, or with *copperas* and *madder*, or with *galls* alone, if it be perfectly finish'd, it will not take any stain from *wine*, *vinegar*, or *urine*.

On the contrary, all colours dyed with wood; as for example, the *red* or the *blue*, in which *brasile* has been us'd, will take stains from the weakest acids, which will cause in them a very visible change.

Indeed *yellow wood* is a sort of exception to this general rule, for its dye does not change so soon.

XIII. *To dye barley straw, &c.* BROWN. Take a sufficient quantity of *lixivium*, *Indian wood ground*, green shells of *walnuts*, of each half a pound; let the straw steep four or five days in a gentle heat, and then take them out.

XIV. *To dye or stain wood of a walnut tree* BROWN. Take the green shells of *walnuts*, dry them in the sun, and boil them in nut oil; and rub the wood with this oil.

JAN BRUEGHEL, *the son of old Peter, call'd* PLUWELEN, or *velvet* BRUEGHEL, born in 1569, a scholar of *Peter Goe-kint*, studied in *Italy*, liv'd at *Brussels*, excell'd in *wakes*, *fairs*, *dances*, *landscapes*, &c. and in little, died in the year 1625, aged fifty six years.

A. D. BRUIN, born in 1560. He engraved six of the twelve *Cæsars*, and various ovals in 1579, and used the first of the marks of *Nicholas de Bruyn*.

BRUSHES. In the choice of *brushes* and *pencils* observe the following directions.

For *brushes*, observe whether the bristles are fast bound in the stocks, and if the hair be strong and lye close together; for if they do not lye close, but sprawl abroad, such will never work well; and if they are not fast bound in the stock, the bristles will come out when you are using them, and spoil your work; as may be seen where the loose hairs of the brush have lain up and down in the colours laid on, to the great disparagement of the work.

To prevent this, if they are not fast bound, drive in some thin wooden wedges, between the thread with which they are bound round, and this will render the bristles tight and secure.

WIRE

## B U C

WIRE BRUSHES are of use for scrubbing those silver, copper, and brass pieces which are to be gilded over, thereby perfectly to free them from any dirt, rust, or filth which may adhere to them; which not being taken off, would hinder the closing of the gold with them. They are therefore us'd by gilders, silversmiths, &c. and are usually sold by iron-mongers.

**A B** or **B** or **N B** **NICHOLAS DE BRUYN.** He used three marks at different times.

*Charles le BRUN*, was born at *Paris*, anno 1620. and he began his studies under *Simon Vouët*, and finished at *Rome* by the favour of Monsieur the Chancellor *Sequier*, who sent him thither with a considerable pension for three years; the first proofs of his abilities after he returned home, were the prize pieces he made two years successfully for the church of *Notre Dame*; and his performances soon afterwards in several of the fine houses in *France*, gave such a lustre to his pencil, that the King (upon the recommendation of Monsieur *Colbert*) made him his chief painter, ennobled him, honour'd him with the order of *St. Michael*. He had a genius lively, penetrating, and equal to every thing he undertook; his invention was easy, and his talent (excepting in landscapes only) universal.

He was not indeed admired for his colouring, nor for his skill in the distribution of his lights and shadows; but for a good gusto of design, an excellent choice of attitudes, an agreeable management of his draperies, a beautiful and just expression, and withal a strict observance of the decorum of his compositions, will command attention and admiration of the nicest judges.

His capital works are the cieling of the gallery, and grand stair-case of *Versailles*, and his five large pieces, containing the history of *Alexander the Great*, the prints of which are alone enough to render his name famous to posterity. He had the superintendency of the manufactures at the *Gobelins*, and for some years, governed all the Kings artificers. He died in *France* anno 1690. ætat. 70.

B. S. signifies *Bartholomew Skenius*, or *Bononensis sculptor*.

**JOSEPH BUCKSHORN** was a *Dutch* painter, born at the *Hague*, who came over to *England* about the year 1670. He was especially eminent for his copies after Sir *Peter Lely*, whose manner he came so near, that several heads of his have been taken by good judges for that great master's.

He copied also *Van Dyck*, and the present Lord *Rockingham* has the picture of the Earl of *Strafford* done by him after that great painter. He was Sir *Peter Lely's* drapery painter for many

ny years, and died in *London* at the age of thirty five, and lies buried in *St. Martin's Church*.

**BUILDINGS**, as **TOWNS**, **CASTLES**, **RUINS**, &c. are painted as follows. 1. Those towns or cities which seem to be far off, must have but little shadowing or heightening, and sometimes none at all; these, if they appear against the sky, must be laid with *Bice* and a little purple, and shaded faintly with a good *blue*.

2. Those which are situated something farther distant, must be laid with *blue* and purple as aforesaid, and shaded with light *blue*, and heightened with *white*.

3. Those which appear at an ordinary distance, must be laid with *vermilion* and *purple*, and shaded with a strong *purple*, shaded with *white*.

4. Those which are near, must be done with *vermilion* and *white*, and shaded with a strong *vermilion*, and brown *oaker*, mixt with *white*.

**STONE BUILDING** [*to paint in miniature.*] Do it with *indigo*, *bistre*, and *white*, for the dead colouring or ground; and then shade with less of this last, and more of the *bistre* and *indigo*, according to the colour you would have the stones to be; you may, if you please, add a little *oker*, both to begin with and to finish.

But to add still to its beauty, you should here and there, especially for ruins, make tints of *blue* and *yellow*; the former of *oaker*, and the latter of *ultramarine*, always mixing them with *white*, whether for the first ground, provided they appear thro' what you lay upon them, or whether you use them at last, finishing and blending them with the rest.

**WOODEN BUILDINGS**, as they are of different kinds, they are left to discretion; but the most usual way is to begin with a mixture of *oaker*, *bistre* and *white*; and finish without *white*, or with but very little; and when the shades require strengthen with *bistre* alone.

For others, you may add sometimes *vermilion*, or sometimes green or black; in a word, according to what you intend, you must mix your colour, and finish with stippling, as for draperies and all the rest.

**BURNING of COLOURS.** There are several colours that require burning; as first *lamp black*, which is a colour of so greasy a nature, that except it is burnt, it will require a long time to dry.

The method of *burning*, or rather *drying lamp-black*, is as follows: put it into an iron ladle or a crucible, and set it over a clear fire, letting it remain till it be red hot, or so near it, that there is no manner of smoke arises from it.

Secondly,

Secondly, *umber*, which if it be intended for colour for an horse, or to be a shadow for gold, then burning fits it for that purpose.

In order to *burn umber*, you must put it into the naked fire in large lumps, and not take it out till it is thoroughly red hot; if you have a mind to be more curious, you may put it in a crucible, and then put it into the fire, till it be red hot; then take it out, and when it is cold, lay it up for use.

*Ivory* also must be burnt to make a black, thus: fill two crucibles with shavings of ivory; then clap their two mouths together, and bind them fast with an iron wire, and lute the joints close with clay, salt, and horse-dung well beaten together; then set it in a fire, covering it all over with coals, and let it remain in the fire, till you are sure the matter inclosed in the crucibles is thoroughly red hot; then take it out of the fire, but do not open the crucibles, till they are perfectly cold; for if you should open them while hot, the matter would turn to ashes; and so it will be, if the joints are not luted close; for it is only the exclusion of all air, that prevents any matter whatever that's burnt to a coal, from turning to a white ash, and preserves the blackness.

**BURNING GLASSES.** A machine by which the sun's rays are collected into a point; and by that means their force and effects heightened to that extreme degree, as to burn objects plac'd in them.

They are of two kinds, either *convex* or *concave*; the *convex* transmit the rays of light, and in their passage refract or incline them towards its axis; having the property of *Lens's*, and acting according to the laws of refraction. See LENS and REFRACTION.

The *concave*, which are the more usual, are very improperly call'd *Burning Glasses*, in that they are usually made of metal; these reflect the rays of light, and in that reflection, incline them to a point in their axes; having the properties of *mirrours*, and acting according to the laws of reflection. See MIRROR and REFLECTION.

Every concave mirrour or *speculum*, collects in rays dispers'd thro' its whole concavity, after reflection into a point or *focus*, and is therefore a *burning mirrour*.

Hence, as the *focus* is there, where the rays are most closely contracted, if it be a segment of a large sphere, its breadth must not subtend an arch above eighteen degrees; if it be a segment of a smaller sphere, its breadth may be thirty degrees.

M. *Kircher* is of opinion, that those *Burning Mirrours*, which do not in their breadth subtend an arch of more than eighteen degrees, are the best of all others.

## B U R

As the surface of a *mirrour*, which is a segment of a larger sphere, receives more rays than another of a less; if the breadth of each subtend an arch of eighteen degrees, or even more or less, provided it be equal, the effects of the larger mirrour will be greater than those of the lesser.

And as the *focus* is contained between the fourth and fifth part of the diameter, *mirrours* that are segments of greater spheres will burn at a greater distance, than those which are segments of a lesser.

And since the *burning* depends upon the uniting or union of the rays on the concave, spherical figure; it is not to be admired at, that even wooden *mirrours* gilded, or such as are prepar'd of alabaster, &c. covered with gold, nay even such as are made of paper, and covered with straw, should be found to burn.

Mr. *Tschirnhaus's* mirrour, the breadth of which is near three *Leipsick* ells, and its focus two ells distant from it, was made of copper, and its substance not more than double the thickness of the back of a knife, according to the account in the *acta eruditiorum*, perform'd as follows:

1. It set fire to green wood instantaneously, so as not to be extinguish'd by a strong wind.

2. It boil'd water immediately, and eggs in it were rendered eatable presently.

3. It caused a mixture of *tin* and *lead* three inches thick to drop presently; and an iron or steel plate became red hot presently, and a little while after burnt holes thro' it.

4. It rendred things not capable of melting soon red hot like iron; such as *stones*, *bricks*, &c.

5. It rendred *slate*, first a white and then a black glass.

6. It converted *tiles* into a yellow glass, and shells into a blackish yellow one.

7. It melted a *pumice-stone* thrown out of a *volcano* into a white glass.

8. It vitrified a piece of a crucible in eight minutes.

9. It quickly turn'd *Bones* into an opaque glass, and earth into a black one.

Dr. *Harris* and Dr. *Desaguliers* inform us, that they found the following effects perform'd by a *Burning Glass* or *Mirrour*, made of a composition of *tin*, *copper*, and *tin-glass*, in width forty seven inches; ground to a sphere of seventy six inches radius. So that its *focus* was about thirty eight inches from the vertex.

1. It melted a *silver* six-pence in 7"  $\frac{1}{2}$ .

2. A King *George* the I's half-penny in 16", and made it run with a hole in 34.

3. It melted *tin* in 3", cast iron in 16", slate in 3".

4. It

## B U S

4. It calcin'd a foffile fhilling in 7".

5. It vitrified a piece of *Pompey's* pillar at *Alexandria* in the black part in 50", in the white in 54", copper oar in 8"; calcin'd bones in 4", and vitrified them in 33.

6. It melted an *emerald* into a fubftance like a *turquois* ftone; and diminifh'd  $\frac{7}{8}$  of the weight of a diamond that weigh'd four grains; vitrified *asbestos*, as it would do all other bodies, if they were kept long enough in the *focus*; which when they are once vitrified, the mirror can go no further with them.

**BURNISHING** is the art of fmoothering or polifhing a body by a violent rubbing it with any thing.

Thus book-binders *burnifh* the edges of their books by rubbing them with a *dog's tooth*.

Gold and filver are burnifh'd with a *wolf's tooth*, a *dog's tooth*, the *bloody-ftone*, *tripoli*, a piece of white wood and *emery*.

Hence a *Burnifher* is a round polifh'd piece of fteel, ferving to fmoother, and give a luftre to metals.

**BUST** { [in fculpture, &c.] a term us'd for the portrait or

**BUSTO** } figure of a perfon in *relievo*; fhewing only the head, foulders and ftomach, the arms being lopp'd off, ufually plac'd on a pedeftal or confole.

M. *Felibien* obferves, that tho' in painting one may fay a figure appears in *Bufto*; yet it is not properly call'd a *Buft*, that word being confin'd to things in *relievo*.

The *Buft* is the fame that the *Latins* call'd *Herma*, from the *Greek Hermes*, *Mercury*; the image of that god being frequently reprefented in this manner by the *Athenians*.

**BUST** is alfo us'd, efpecially by the *Italians*, for the trunk of an human body, from the neck to the hips.

*Menage* derives it from the word *busque*, a piece of wood, ivory, or whalebone, or the like, which women apply to their ftomachs, to keep themfelves ftreight, which the *Italians* call *busto*.

**BUSTLER** was a *Dutchman*, both a hiftory and face painter in the reign of King *Charles II*. There is a good picture, partly performed by him, in Mr. *Elfum's* poffeffion of the *Temple*, which confifts of three boors playing together in different actions by Mr. *Bufler*, a good landfkip behind by Mr. *Lanckrinck*, and a little dog on one fide by *Hondius*.

*How to take the IMPRESSION of any BUTTERFLY in a minute in all colours.* Kill the butterfly, but take care not to injure the wings, but fpread them open in a flying manner as exactly as may be; then take a piece of white paper, and with a fmall brush or pencil, wafh a part of the paper with gum-water, a little thicker than ordinary; fo let it dry leifurely; then lay the *Butterfly* on the paper, and when you have fixt it



## C A L

well, cut away the body close to the wings, and throw it away ; (that the pressing of the body may not squeeze out the intrails, and spread and smear the impression) then lay the paper on a smooth board, with the wings of the butterfly upwards, and on the fly another paper, and a smooth trencher upon that ; and put the boards, paper, and wings all together into a linen screw-press, and screw it down very hard, and let it stand in it for an hour ; and then take off the butterfly's wings, and there will remain on the paper their perfect impression in all their beautiful colours.

But if you have not a screw-press, lay weights upon your uppermost board, and it will come off very well.

The reason of this is, that all the fine colours that appear on the wings of a butterfly, are a sort of fine feathers, or rather a powder, which sticks so fast to the gum, that when the gum is dry, they leave the wing.

After you have thus gotten the beautiful wings, you may draw the body, &c. of the butterfly, and colour the drawing of it after the life.

NICHOLAS BYER was a history and face painter, born at *Dronthem* in *Norway*. He was much employed by the late Sir *William Temple* at his house at *Shene*, near *Richmond*, in *Surrey*, where he died about forty six or forty seven years ago. He was a painter of good hopes, but died young, the effect of an intemperate life. He lived with Sir *William* three or four years, during all which time, he was constantly employed by him in one sort of painting or other.

One thing is remarkable in him, and that is, that he was the first man that was buried in *St. Clement's Danes*, after it was rebuilt, and which had been first built by his countrymen.

## C.

C. B. signifies *Cornelius Boss*. This artist engraved *Julio Romano's Bacchanal*.

C. Bl. } signifies *Cornelius Bloemart*, son of the famous  
Born. Blo. } Dutchman, *Abraham Bloemart*.

C. Bleher, the mark of *Cornelius Bleher* in certain historical landscapes 1636.

CALAMINE STONE	}	a kind of fossil bituminous earth
LAPIS CALAMINARIS		much us'd in foundery ; being
CALAMITE		us'd in tinging copper of a yel-
CADMIA		low colour, <i>i. e.</i> in converting it into brass.

## C A L

It is either of a greyish colour, as that of *Germany* and *England*; or reddish, as that about *Leige*, and in some parts of *France*, accounted the best, because yellow by calcination.

It is dug out of mines, usually in small pieces, having eyes, sometimes veins, of lead usually; tho' not always found in lead mines.

It is generally dug in barren rocky ground; its courses running usually at fix a clock (as the miners phrase it) *i. e.* from east to west, sometimes at nine and sometimes at twelve; or perpendicular, which is accounted the best.

After it has been dug, it is wash'd, or *buddled* (as they term it) in a running water, which carries off the impurities and earthy parts, leaving the lead, *calamine*, and other sparry parts at the bottom; then it is put into a sieve, and shaken well in water, and the lead that is mixt with it sinks to the bottom, the sparry parts ascend to the top, and the *calamine* remains in the middle.


Having been thus prepar'd, they bake it in an oven for four or five hours, the flame being so contriv'd as to pass over, and so to heat and bake the *calamine*; it is kept continually stirred and turned with an iron rake.

This being done, it is pounded to a powder, and all the stones found in it are picked out, and then it is fit for use.

As to the manner of applying it in the preparation of brass, see the article BRASS. And for other uses, other articles.

·**PAOLO CALIARI** *Veronese*, born in the year 1532, scholar of his uncle *Antonio Badile*, liv'd at *Venice*, excell'd in history and portraits, died in the year 1588, aged fifty-six years.

**CALLIOPE**, one of the muses, the president of heroick poetry, is represented in painting with a coronet of gold upon her head, and upon her left arm garlands of bays in store for the reward of poets; and in her right hand three books, on which are written, *Homerus*, *Virgilius*, *Ovidius*.

 **GIO** or (*John*) **BAPTISTA CALLESTRUCCI** an engraver, who is inserted in the catalogue of *Roman* painters in the year 1652, used this mark.

**CALKING** is a term us'd in painting, &c. where the back-

**CALQUING** is side of any design is covered with a black or red colour; and the strokes or lines, trac'd thro' on a wax'd plate, wall, or other matter; by passing lightly over each stroke of the design with a point, which leaves an impression of the colour on the plate or wall.

**CALUMNY** is represented in painting by a beautiful, rich, and young woman, approaching towards a judge in gorgeous habit, with an angry, scornful, and discontented look, and red and fiery eyes; holding in her left hand a flaming torch, and

with her right hand, she by force draws a young man by the hair of the head.

LUCA CANGIASI, *or* CAMBIASO, born in the year 1527, scholar to his father, liv'd at Genoa and in Spain, excell'd in history, died 1683, aged fifty six years.

CAMERA OBSCURA, *i. e.* a DARK CHAMBER, is a machine or apparatus, representing an artificial eye; whereon the images of external objects are exhibited distinctly, and in their native colours, either invertedly or erect.

The use of this machine is manifold; it serves to many good purposes in explaining the nature of vision; and hence it is that it is by some call'd the *artificial eye*.

It affords very diverting spectacles, both by exhibiting images, perfectly like their objects, and each cloth'd with their native colours; and by expressing at the same time all their motions, which latter no art can imitate.

The theory of the *Camera Obscura* is contained in the following proposition.

If an object *A B* (*figure 1.*) radiate through a small aperture *C*, upon a white wall opposite thereto, and the place of radiation behind the aperture *b C a* be dark; the image of the object will be painted on the wall in an inverted situation.

*Demonstration.* For the aperture *C* being very small, the rays issuing from the point *B* will fall on *b*; those from the points *A* and *D* will fall on *a* and *d*: wherefore since the rays issuing from the several points are not confounded, when reflected from the wall, they will carry with them a certain species of the object, and exhibit its appearance on the wall.

But since the rays *A C* and *B C* intersect each other in the aperture, and the rays from the lowest parts fall on the highest, the situation of the object will of necessity be inverted.

*Corollary.* Since the angles at *D* and *d* are right, and the vertical ones at *C* are equal, *B* and *b* and *A* and *a* will be also equal; consequently, if the wall whereon the object is delineated, be parallel to it,  $a, b : A B :: d C : D C$ ; that is, the height of the image will be to the height of the object, as the distance of the object from the aperture, is to the distance of the image from the same. See the plate, figure 1.

*Construction* of a CAMERA OBSCURA, wherein the images of external objects shall be represented distinctly, and in their genuine colours, either in an inverted, or an erect situation.

1. Darken a chamber, one of whose windows looks into a place set with various objects, leaving only one little aperture open in the window.

2. In this aperture fit a lens, either *plano convex*, or convex on both sides, to be a portion of a large sphere.

3. At

## C A M

3. At a due distance, to be determin'd by experience, spread a paper or white cloth, unless there be a white wall for the purpose; for on this, the images of the desired objects will be delineated invertedly.

4. If you would rather have them appear erect, this may be done either by means of a concave lens, plac'd between the centre and the focus of the first lens; or by receiving the image on a plane *speculum*, inclin'd to the horizon under an angle of  $45^{\circ}$ ; or by means of two lens's included in a draw tube instead of one.

*Note*, that if the aperture don't exceed the bigness of a pea, the objects will be represented, even tho' there be no lens at all.

To render the images clear and distinct, 'tis necessary that the objects be illumin'd by the sun's light; they will be still brighter, if the spectator first stay a quarter of an hour in the dark.

Care must be likewise taken, that no light escape through any chinks; and that the wall ben't too much illumin'd.

Farther, the greater distance there is between the aperture and the wall, the larger and more distinct will the images be; but the rays becoming thus too much dilated, the brightness of the image is weakened, till at length it becomes invisible.

The construction of a portable CAMERA OBSCURA.

1. Provide a little chest or box of dry wood, in the figure of a parallelopipedon, in breadth about ten inches, and its length two feet or more, according to the different magnitude of the diameter of the lens. See plate, fig. 2.

2. In the plane B D, fit a sliding tube E F with two lens's, or to set the image at a less distance from the tube with three lens's convex on both sides; the diameter of the two outer and forwarder to be  $\frac{1}{100}$  of a foot; that of the inner less, v. g.  $\frac{1}{1000}$ .

3. Within the chest, at a proper distance from the tube, set up an oil'd paper, perpendicularly G H, so as that images thrown upon it may be seen through.

4. And lastly, make a round hole in I, so as a person may look conveniently through it with both eyes.

If then the tube be turn'd towards the objects (the lens's being at their proper distance, which is to be determined by experiment) the objects will be delineated on the paper G H as before.

*Another portable CAMERA OBSCURA.*

1. In the middle of a *cistula* or chest, (see plate, figure 3.) raise a little turret, either round or square H I, open towards the object A B.

## C A R

2. Behind the aperture, incline a little plain mirror *ab* to an angle of 45, which may reflect the rays *Aa* and *Bb* upon a lens convex on both sides *G*, included in a tube *GL*.

3. At the distance of the focus of it, place a table, covered with a white paper *EF*, to receive the image *ab*.

4. And lastly, in *NM* make an oblong aperture to look thro'.

By means of this instrument, a person unacquainted with designing, will be able to delineate objects to the last accuracy and justness; and another well vers'd in painting, will find many things herein to perfect his art.

**DO** DOMENICO CAMPAGNOLA, a *Venetian*,  
**CAP** and scholar to *Titian*, us'd this mark; we meet with some of his pieces engrav'd in 1518. His brother *Julio* was also an engraver.

ANNIBAL CARACCI, born in the year 1560, scholar of *Lod. Caracci*, studied *Correggio*, *Titian*, *Rafael*, and the antique, liv'd at *Bologna* and *Rome*, excell'd in history died 1609, aged forty nine years.

ANTONIO CARACCI, call'd IL GOBBO, born in 1583, scholar of *Annibal Caracci*, liv'd at *Rome*, excell'd in history, died in 1618, aged thirty five years.

LODOVICO CARACCI, born in the year 1557, scholar of *Prospero Fontana*, and studied *Parmegiano*, *Titian*, &c. liv'd at *Bologna* and *Rome*, excell'd in history, died in 1619, aged sixty four years.

AUGUSTINO CARACCI, born in the year 1557, scholar of *Domenico Tebaldi*, *Aless. Minganti*, and his cousin *Lodovico*; liv'd at *Bologna*, *Rome*, and *Parma*, excell'd in history graving, died in the year 1602, aged forty five years.

POLYDORO da CARAVAGGIO, born in 1495, studied *Gio. d'Udine* and *Matturino*; liv'd at *Rome*, *Naples* and *Messina*; excell'd in history and architecture; died in the year 1543, aged forty eight years.

CARBUNCLE is a very precious stone, of which several authors have written; but I don't know one who says he has seen it.

They attribute to this stone the property of giving light in the dark like a burning coal, or a kindled lamp.

*Ludovicus Verromannus* reports, that the King of *Pegu* carried one about him of such bigness, and so great splendor, that those who saw that prince when it was dark, saw him shining as if incircled with the sun; but this author, as well as the rest, says he never saw one.

*Pliny* pretends, there are many sorts of Carbuncles, some male ones more hard and brighter, and others female more languid.

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guid. But this author is so indistinct and so little assur'd of it, that his testimony cannot be taken for authentick. Yet among all those species which he describes, those seem to approach the nearest to *carbuncles*, which he calls *Lithizontes* and *sandastri*.

The first discovers strongly its splendor at the fire or sun; being in the shade, it appears of a purplish colour; being expos'd in the open and clear day, it sparkles as it were at the sun-beams, and hides as it were bright stars within it.

The second is curious, by reason of golden sparkles appearing and glittering within like stars, which are always seen across it within side, but never near the surface, imitating the *Hyades* by their number, disposition, and order.

This author says lastly, that the *Chaldæans* held this last stone in great veneration, and us'd it in all their ceremonies.

It is indeed very probable, that the *Carbuncle* is that stone the antients have related to give light by night, like a flaming fire, and by day like a twinkling star, which is now no more to be found.

But whether the *Carbuncle* be a precious stone, found in the bowels of the earth or not, the properties that these authors have given it, may be imitated by the help of art. And this may be done two ways, as follows.

Take ten ounces of matter, prepar'd with *saturnus glorificatus*, (see SATURNUS, &c. in S.) and natural crystal reduced to an impalpable powder, as there directed; add to this half an ounce of *crocus Martis* in fine powder prepared. (See CROCUS, &c.)

Mix these powders well together, and put them into a good crucible, which cover and lute well; then put it into a glass house fire for three days, putting it nearer and nearer the strength of the fire by degrees.

Then take out the crucible, and put the matter into a marble mortar; then pound and grind it very small, with its weight of *sal gemmæ*, and put it into another crucible, which cover and lute as before.

Being dry, put it into the same glass house furnace, removing it nearer to the fire by little and little, and let it stand for twenty four hours in a good fusion.

Then take it out, and put it into the furnace to bake again, as you do glass, where leave it twelve hours, that it may cool gently.

When the crucible is cold, take it out of the furnace to bake again, then break it, and you'll find in it the matter tinged of a very fine *carbuncle* colour, which you may cut of what form you please; polish it at the wheel, and it will be perfect.

**CARBUNCULUS** *nocte illuminans*, which is a stone far more resplendent and fairer than the former. But

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But this is not a stone any where form'd by nature; but may be made by art.

But to imitate this second Carbuncle, or rather the beauty which authors attribute to it, do as follows.

Take ten ounces of matter, prepar'd of natural *crystal*, and *faturnus glorificatus*, and having reduced them to an impalpable powder, add to it an ounce of gold calcin'd (as will be shewn in the articles **CALCINE** or **GOLD**) mix the whole well together, and put it into a good crucible, which must not be above half full; cover it and lute it well, let it dry; then put it into a glass house furnace for three days, bringing it by little and little nearer to the strongest fire.

After three days, take out the crucible, and put the matter into a marble mortar, which pound to an impalpable powder, to which add its weight of *sal gemmæ*, also in fine powder, which mix well together, and scarce through a fine sieve, the better to incorporate.

Put this powder into a new crucible, which you must not fill above half way; which cover, lute and dry as before: then put it into a glass house furnace, bringing it nearer to the fire by little and little, where let it stand ten hours.

After this, take your crucible out of the furnace, and put it into that where they set their glasses to anneal; let it stand for ten or twelve hours; then take it out, and by breaking it, you will find the matter ting'd of a *carbuncle* colour, the most lively and resplendent that can be made by this art; whereof you may make what stones or works you please.

**CARE.** Though it commonly makes one old, yet she in painting is represented so as to appear comely; she is winged holding two hour glasses, a cock at her heels, and the sun rising from the ocean.

Her handfomeness denotes her taking time by the forelock, and stopping all good things; the wings denote quickness; the glasses and sun shew that care and solitude is never weary.

**CARICATURAES** [in painting] as to make caricaturæ is to exaggerate, the defects, and conceal the beauties in persons faces; however preserving the resemblance.

**JOHN CARINGS** was an *English* landscape painter, who lived the better part of his time in *Holland*, and drew many views of that country in a manner very neat and elaborate. His pieces bore a great price in his life-time, but having little besides their neatness to recommend them, they have since been less esteemed. He died at *Amsterdam* about ninety six years ago.

**ANNE CARLISLE** was an *English* gentlewoman, contemporary with *Van Dyck*. She copied the *Italian* masters so admirably,



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rably well, that she was much in favour with *Charles I.* who became her patron, and presented her and Sir *Anthony Van Dyck* with as much ultramarine as cost him above 500*l.* She died in *London* about fifty two years ago.

CARLO (call'd CARLINO) DOLCI, born in the year 1616, studied *Jacopo Vignali*, liv'd at *Florence*, excell'd in History.

CARMINE, a red colour, very vivid, bordering somewhat on the purple, us'd by painters in miniature; and sometimes painters in oil, tho' rarely, by reason of its great price.

*Carmine* is the most valuable product of the *cochineal mestique*; which is a fecula or sediment, residing at the bottom of the water, wherein *cochineal*, *conan*, and *antour* has been steep'd: some add *rocou*, but this gives carmine too much of the oval cast.

That which is good is almost in an impalpable powder.

Some make *Carmine* with *brazile wood*, *fernambouc*, and leaf gold beat in a mortar, and steep'd in white wine vinegar; the scum arising from this mixture, upon boiling, when dried, makes *Carmine*; but this kind is vastly inferior to the former.

*Another Carmine.* Steep a pound of *brazile wood*, of *fernambouc* of the colour of gold, for three or four days in an earthen vessel or pot of white wine vinegar; after having broken it well in a mortar, boil it half an hour.

Then pass or strain it through a very coarse linen cloth, and set it again upon the fire.

Take another little pot of white wine vinegar, and in it steep or temper eight ounces of alum. Put this alum so tempered in the other liquor, and stir it about well with a spatula.

The scum or froth which arises is the *Carmine*; take it off as it rises, and let it dry. The same may be done with *cochineal* instead of *brazile*.

*Another Carmine.* Take three pints of spring water, which has not passed through leaden pipes; put it into a glaz'd earthen pot, and set it on the fire.

When it is ready to boil, put in half or a quarter of an ounce of the grain of *coban* or *dyer's red*, which the feather dyers use, reduc'd to a fine powder.

Then boil it for about three quarters of an hour, or till the fourth part of the water be consum'd. Let the fire be a coal fire.

Then strain this water through a linen cloth into another well glaz'd vessel, and set it on the fire till it begins to boil; then put in an ounce of *cochineal*, and a quarter of an ounce of *arnotto*, both reduc'd to powder apart; and let this liquor  
boil

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Boil away to one half, or rather till it raises a black scum, and is very red; for it takes a colour by being boil'd.

Then take it off the fire, and strew into it half an ounce or three pinches of *rock alum*, or *Roman alum*, pulveriz'd, which last is reddish and better; and about half a quarter of an hour after, strain it through a linen cloth into a vessel well glaz'd, or you may divide it in several small *Dutch* glaz'd porringers, in which let it stand to settle for twelve or fifteen days, and there will appear on the surface a mouldy skin, which you are to take off with a sponge, and expose the matter underneath to the air.

When the watry part on the top is evaporated, dry the matter which remains at the bottom, and grind it upon a very hard and smooth marble stone or porphyry, and then sift it through a very fine sieve.

The quantities of these ingredients are not so fixt to the proportion before directed, but that you may put in either more or less of them at discretion, according to the depth or degree of colour you desire.

If you would have the *Carminé* redder, you may put in more *arnotto*, if more of a crimson, more *cochineal*; but all of them must be reduc'd to powder separately, and the grain of *coban* or *dyers weed* must first be boil'd alone, and the other altogether as before directed.

CARNATIONS [in miniature.] It is the same with *carnations* and *pinks* as with *anemonies* and *tulips* (both which see) for some of them are variegated or mixed with several colours, and some of them are of one single colour.

The first are sometimes streak'd, striped, or mark'd, sometimes with *vermilion* and *carminé*, and sometimes with *lake*; at other times with pure *lake*, or with *white*. Some are deep, others are pale; sometimes they are variegated with small or narrow strokes.

Their grounds are commonly shaded with *indigo* and *white*.

There are some of these flowers of a very pale flesh colour, and variegated with another deeper, made of *vermilion* and *lake*.

Others are of *lake* and *white*, which are shaded and variegated without *white*.

Others again are all *red* with *vermilion* and *carminé*, as deep as possible.

Others again are all *lake*.

In short, there are others of great variety, which nature herself, or your own fancy, will direct you to represent.

The green of all of them is of the sea hue, and shaded with *Iris green*.

CARNATION,

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**CARNATION**, *i. e.* *Flesh colour* in painting, is understood of all the parts of a picture in general, which represent flesh; or which are naked, without drapery.

*Titian* and *Corregio* in *Italy*, and *Rubens* and *Van Dyke* in *Flanders*, excell'd in *carnations*.

*Of Carnations or Flesh Colouring* [in miniature]. In colouring for flesh, there is so great a variety, that it is hard to lay down any general rules for instruction therein, neither are any rules regarded by those who have acquir'd a skill this way; for they copy from originals, or work by their own heads, without knowing particularly, why or wherefore; so that the most able hands, who work with the least thought and trouble, would be so much the harder put to it, if they were call'd upon to assign a reason for their practice and teaching as to their colouring and tints.

Nevertheless, as beginners stand in need of immediate instruction, I shall here, in general, shew how you are to paint the different sorts of flesh.

First then, having drawn your figure with carmine and adjusted your piece, you must lay on for women, children, and in general, for all soft and tender colouring, white mixt with a little blue for faces, the composition of which will be given hereafter; but it must hardly appear.

And for men, instead of blue use vermilion for your dead colouring, and when they are old, let it be mixt with oaker.

Then you are to run over all the features with *vermilion*, *carmine* and *white* mingled together, and form all the shades with the same mixture, adding *white* as they weaken, using scarce any of it as they strengthen, except in certain places, where it must be laid on boldly; as for example, at the corners of the eyes, under the nose, the ears, under the chin, between the fingers, in all the joints, the corners of the nails, and generally in every part where it is necessary to express a separation in the dark shades; nor need you fear to give them all the strength which they ought to have from the first sketch, because in working thereon with green, it constantly weakens the red which was first laid on.

Having drawn with red, make blue tints with ultramarine and a good deal of white, upon the temples, beneath and at the Corners of the eyes, on each side of the mouth, above and below it, a little upon the middle of the forehead, between the nose and the eyes, on the sides of the cheeks, on the neck, and other parts where the flesh has a bluish cast.

Also you must make yellowish tints with oaker, orpiment and a little vermilion mixt with white, above the eye-brows, at the sides of the nose towards the bottom, a little beneath the cheeks, and the other parts near.

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In these it is that you must well observe nature, for painting being no more than an imitation of nature, every deviation from her is a blemish, and truly a fault.

Now having dead colour'd, drawn, and disposed of your tints, you must proceed to shade, stippling with green for your flesh, mixing therewith, according to the rule prescrib'd for tints, a little blue for the fading parts; and on the contrary a little yellow for the stronger parts, or such as are nearest to you. On the extremities of the shades, next to the lights, you must imperceptibly blend your colour with the ground of the flesh, first with blue, then with red, agreeable to the part you are upon; and if this mixture of green does not darken enough at first, you must go over the shades with several repetitions, sometimes with red, and sometimes with green, always stippling till the whole be perfect.

And if with the colours you cannot give your shades all the strength they ought to have, you may finish the darkest parts with orpiment, oaker or vermilion, and sometimes with bistre only, according to the colouring you would make, but lightly, laying it on very thin.

You must stipple upon the lights with a little vermilion or carmine, mixt with a good deal of white, and a very little oaker, to lose them with into the shades, and make the tints die away imperceptibly into each other, taking care while you are stippling or hatching, that your strokes follow the out-line of the flesh; for although your hatching must cross in all directions, that ought to appear a little more, because it rounds off the parts.

And because this mixture might make the colouring too red if it was always used, moreover you must endeavour to confound the tints and the shades with blue, a little green, and a great deal of white, so that it be very pale; but with this you must not work upon the cheeks, nor upon the extremities of the lights, no more than with the other mixture upon these last, which are to be left in all their brightness, as certain parts of the chin, of the nose, upon the forehead, and upon the cheeks, which, and the chin, ought, however, to be redder than the rest, as well as the feet, the inside of the hands, the fingers, and the toes.

Observe here, that these two last mixtures ought to be so very pale, that you should hardly see your self work, they being purely design'd to soften the piece, to melt the tints into each other, to blend the shades with the lights, and to deface the lines; be careful not to make much use of the red mixture upon blue tints, nor of blue upon others; but change colour from time to time, as you perceive your work too blue or too red, 'till the piece be finish'd.

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The various colourings for *Carnations* may be easily produc'd by taking more or less *red*, *blue*, *yellow* or *bistre*; whether for the first colouring or for finishing the colouring for *women* should be *bluish*; for children a little red; both fresh and gay, and for the men it should incline to yellow, especially if they are old.

*Of dying a Carnation or Red-Rose colour.*

I. *To dye a Red-Rose Carnation or blood red.* Take liquor of wheat bran, a sufficient quantity, alum three pounds, tartar two ounces, boil them and enter twenty yards of broad cloth, boil three hours, cool and wash it; take fresh clear bran liquor a sufficient quantity, *madder* four pounds, boil and sadden according to art.

II. *Red-Rose or Carnation colour.* Take wheat bran liquor a sufficient quantity, alum two pounds, *tartar* two ounces, boil and enter twenty yards of camlet, boil three hours; after which, take it out and wash it very well, then add *madder* a pound, enter and boil it again, cool and wash it; after which take clear liquor a sufficient quantity, *cochineal* in fine powder two ounces, tartar two ounces; enter your camblet, boil and finish.

III. *Another Carnation colour.* Take running water four gallons, pot ashes two pounds, mix and digest forty eight hours, this done, divide the liquor half into one pot, and half into another pot; let the first pot stand in the hot embers up to the top or in a furnace, and the other by a fire to keep warm, and to fill up the first pot as it boils away; into the first put *red brisca* or *Spanish flocks*, or wool two pounds, let it boil till it is thick, adding alum and a little gum Arabick, of each the quantity of a walnut; diminish the heat and let it be only scalding hot, then put it in the matter you would dye, letting it lye twenty four hours in the liquor.

IV. *An excellent Observation.* The *Bow-dyers* know that the solution of *Jupiter* (which is delved tin) being put in a kettle to the *alum* and *tartar*, makes the cloth, &c. attract the colour into it; so that none of the *cochineal* is left, but is all drawn out of the water into the cloth.

V. *Another Observation.* The spirit of *nitre* being used with *alum* and *tartar* in the first boiling, makes a firm ground, so that they shall not spoil nor lose their colour by the sun, fire, air, vinegar, wine, urine or salt-water, &c.

GLORALAMO DA CARPI, born in the year 1501. scholar of *Renvenuto Gorofalo*, studied under *Correggio*, liv'd at *Bologna*, *Modena*, *Ferrara*, *Rome*, &c. excell'd in history and architecture, died in the year 1556, aged fifty five years.

UGO DA CARPI, he found out the art of printing in *chiaro obscuro*, with two plates of box, then with three like drawings.

CARTON,

**CARTON**, } is a design drawn on strong paper, to be af-  
**CARTOON**, } terwards calk'd through, and transfer'd on  
 the fresh plaister of a wall to be painted in fresco.

**CARTOON**, is also us'd for a design coloured, for working in *mosaic, tapestry, &c.*

The cartoons preserv'd at *Hampton-Court*, are designs of *Raphael Urbin*; intended for tapestry.

**JACOBO CARUCI da PUNTORM**, born in the year 1493, scholar of *Lionardo da Vinci, Marietto Albertinelli, P. di Cosimo*, and *Andrea del Sarta*; liv'd at *Florence*, excell'd in history and portraits, died in the year 1556, aged sixty three.

**CARYATIDES** } a kind of order of columns or pilasters in  
**CARIATES** } architecture, under the figures of women  
 dress'd in long robes.

**GIORGIO del CASTEL FRANCO**, call'd **GLORIONE**, born in the year 1477, scholar of *Gio. Bellini*, and studied *Lionardo da Vinci*; liv'd at *Venice*, excell'd in history, painting and portraits, died in the year 1511, aged thirty four years.

**B or E in** The first of these marks is of *Bernardo Castelli*, a *Genoese* painter and inventor. The second is of *Cammillo Congio*, an engraver, whose mark was also *CC Fecit.*

**G** **GIO BENEDETTO CASTIGLIONE** of *Genoa*, a famous painter and engraver of all subjects, used this mark.

**BENEDETTO CASTIGLIONE**, a *Genoese*, the scholar of *Batt. Paggi*, instructed by *Van Dyke*, rambled in *Italy*, excell'd in history, landscapes and animals.

*Of CASTING FIGURES in PLAISTER.* Besides what is said of making a cavity for casting in wax, see **WAX**, (see the articles **FOUNDERY** and **STATUES**) it will be no hard matter to conceive how figures are made of **PLAISTER**; for it being easily tempered, and running as easily, 'tis poured into the mould, and sometimes the figures are taken out all in one piece, especially when the founder is master of his business, and well experienced in it.

All the art is to chuse good *plaiſter* in stone, that there may be no coal among it; it ought to be well burnt, well pounded, very white, sifted through a fine sieve: however, if it is a great figure, 'tis moulded at several times, and even several parts of the figure, in each piece of the cavity, are half fill'd before they are set together, that they may hold the better, and the better form all the parts.

We see by what *Pliny* writes, that the custom of making moulds of *plaiſter* is very antient; and that 'twas made use of  
 about

about earthen figures and plaister figures a long time before it was known how to cast in metal.

**CASTING** *Figures in LEAD.* There are not so many precautions necessary when figures are cast in LEAD, as when they are done in brass; because *lead* is not so strong. See **STATUES**.

The workman only fills the cavities with earth well managed, of what thickness he pleases; then he fills all the mould with *plaister* or *tile-dust*, with which the soul is made.

When the soul is finish'd, all the pieces of the mould are taken asunder, to take off the earth; and then being clos'd again, are put about the soul, but at four or five inches distance.

That interval is fill'd with coal from top to bottom; all the gaps between the pieces of the mould are fill'd with *brick*, and the coal being set fire to, 'tis all lighted. This is to seeth the soul, and dry the plaister mould which the earth had wetted.

When all the coal has been well lighted, and after it is gone out of it self, the workman takes a pair of bellows, and blows off the ashes that may have got into the pieces of the mould; then those pieces are join'd together again as before about the mould; all the *chapes* are well ty'd with cords, and cover'd with *plaister*; after which the melted lead is pour'd into the mould, which lead fills the space which was taken up by the earth; nor is it necessary to earth the mould as in casting in brass, unless 'tis for great figures.

The tools us'd in casting in lead are the same the plumbers use.



FRANCIS CAVEAU, who engrav'd a great many plates, us'd this mark.

FREDERICO CASAUBON, *alias* KERSEBOOM, was born at *Solingen* a city of *Germany* in the year 1623. At eighteen years of age, he went to *Amsterdam* to be instructed in the art of painting; to *Paris* in 1650, and work'd some years under Monsieur *le Brun*; but afterwards was sent to *Italy* by the Chancellor of *France*, and maintained there by that minister for fourteen years, two whereof he spent with *Nicholas Poussin*, of whose manner he was so nice an imitator, that some of his pieces were taken for his. Thus qualified for history painting, he came to *England*; but not finding encouragement that way, he bent his studies towards portraits, wherein he was not unsuccessful, either as to drawing or likeness. He was the first who brought over the manner of painting on glass, (not with a print, as the common way now is) in which he perform'd some histories and heads exceedingly well. Perspective he understood thoroughly, having been disciple to two excellent masters in



that art; and was, in short, an accomplished painter. He died in *London* in the year 1690, and lies buried in *St. Andrews Holbourn*.

*C. C. Fecit.* stands sometimes for *Camillus Congius*, and sometimes for *Charles Cignali* of *Bologna*, painter, *inv.* He used also two C's, the one within the other.

*C. D. F.* signifies *Charles David fecit.*

**CELERITY** is represented in painting, by a woman with a thunderbolt in her right hand, a dolphin by her side, and a hawk flying in the air.

The moral is obvious, all those things being naturally very quick in their motion, which well expresseth celerity.

**CEMENTS** as to melt crystal for a strong Cement. Pound crystal, and put it into an iron ladle, cover it and lute it well, and heat it in the fire till it is red hot, which quench in oil of tartar; this do so often, till they will be easily reduc'd to powder in a mortar, which will then easily melt.

This is of use to make strong cement, and to counterfeit jewels with.

*To make a CEMENT for broken glasses.*

1. Mix glair of eggs with quick lime, and this cement will join broken pieces of glass together, and all earthen pots, so that they will never break in the same place again.

2. Or thus, Take old liquid varnish and join the pieces with it; tie them together, and dry them well in the sun, or in an oven, and they will never unglue again; but you must not put hot liquor into them.

3. Take white lead, red lead, quick lime, and gum sandarach, of each half an ounce, and mix all these with the glair of four eggs.

4. Take quick lime powdered, liquid varnish, and glair of eggs, of each a like quantity; grind them upon a stone; this will be a strong cement even for stones. Or,

5. Take white lead, bole, and liquid varnish as much as sufficeth. Or,

6. Take fine powder of glass, quick lime and liquid varnish, of each a sufficient quantity.

7. Take calcin'd flints and egg-shells of each a like quantity, and with whites of eggs and gum tragacanth or dissolution of gum sandarach, make a cement. This in a few days will be as hard as a stone.

8. Take of calcin'd flints two pound, quick lime four pound, as much linseed-oil as may temper the mixture; this is a very strong cement, but with liquid varnish would be stronger.

9. Take fish glue, and beat it thin; then soak it in water till it is like a paste; make rolls of it, which draw out thin, and when

when you use it, dissolve it in fair water over the fire, letting it seeth a while, keeping scumming of it, and use it while it is hot.

**CERUSS** a preparation of lead, commonly call'd white lead, and by the chymists calx of lead.

*Cerufs* is made of very thin *laminæ* or plates of lead, so laid as to receive and imbibe the fumes of vinegar, plac'd in a vessel over a moderate fire.

The *laminæ*, or plates, are by means hereof converted into a white rust, which is gathered together; and being ground up with water, is formed into little cakes.

*Cerufs* makes a beautiful white colour, and is much us'd by painters both in oil and water colours.

The best *cerufs* is that of *Venice*, but this is rare; that which is chiefly us'd, is either *English* or *Dutch*; both of which have more marl in them than white lead; the latter however is the better of the two.

**CHALCEDONY**, is a precious stone of a bluish or yellowish colour, rank'd among the kinds of *agate*. It is suppos'd, by some, to be the *white agate* of the ancients, though there are sometimes found pieces of it blackish.

This stone is very fit for engraving, and much us'd, either to engrave arms, &c. upon, as being harder and preferable to crystal, if good, or to paint them on the backside. In some places, vases, cups, &c. are made of it. That which is clearest with a pale cast of blue is accounted the best.

*To make a CHALCEDONY in glass.* There are three different ways to prepare an artificial *Chalcedony*, which will make three different species of it, all of them very fair, but whose beauty also may be augmented by the number of ingredients, they are compos'd of; and which cause those diversities of colours, which that stone ought to have.

Among the rest of the ingredients employ'd for this purpose, there are some that give no colour to glass, as *tartar*, *foot*, *armoniac* and *mercury*.

Those that are of an uncommon nature, as *lead*, *foot*, *tartar*, the *azure stone*, often hinder the union of the ingredients, by reason of the separation which may happen by the cooling the metal; which does not happen to those who know how to observe the degree of heat, wherein the principal knowledge of this art consists.

*To make the first sort of CHALCEDONY.* Put a pound of *aqua fortis* prepar'd into a glass body with a long stick, and two ounces of silver in small and thin plates, or granulated, put the body in an ash furnace over a soft fire or in warm water, and the silver will be presently dissolv'd.

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At the same time, take another body and dissolve in it three ounces of quicksilver, in twelve ounces of the same *aqua fortis*; then mix both the solutions together into a larger body, which set into the same bath of warm water, or ash furnace; then add to it three ounces of *sal armoniac*, which dissolve over a gentle fire, then add to it half an ounce of *zaffer*, and a quarter of an ounce of *manganese* prepar'd by little and little, with as much *Feretto* of *Spain*, also by little and little; for fear the matter coming to swell too much, should break the vessel.

Add to all these ingredients half an ounce of *crocus martis* calcin'd with *sulphur*, as much scales of *copper* three times calcin'd, which ought to boil like *manganese*; as much blue lake (such as is us'd by painters) and the same quantity of red lead, the whole reduc'd to powder.

In putting in these powders, you must gently stir the glass body, that they may the better incorporate with the *aqua fortis*, but be sure to take care that there be not too much heat; then stop the mattrafs (or glass body) very well, stirring it well every day for ten days, that the powders may well incorporate, and that they may always appear as separated from the water.

Set the large glass body into a sand furnace, in a temperate heat, or rather empty it into a glass cucurbit, after you have well luted it at the bottom, and set it over the same fire, so that the *aqua fortis* may evaporate in twenty four hours; and at the bottom of the vessel you will have a yellow powder, which keep safely in glasses for use.

When you are to make the *Chalcedony*, take white crystal in glass, well purified, and that has been often melted; for crystal new made, is not fit for that operation, because the colours will not stick to it, but are consum'd by the frit.

Put about ten pounds of this crystalline glass into a pot, and when it is well melted, put in about an ounce and a half of your yellow powder at three different times, mix the glass well with it each time, that the powder may incorporate with it, the glass being thus well mixt; let it stand an hour, then mix it once more, and let it stand for twenty four hours; then mix it again for the last time, and make an essay of it, it will give a yellowish azure colour.

Having made your essay, and found your matter right, the pot may be taken out of the furnace, and when it is cold, you'll have the colours which shall represent the wavings of the sea, and other fine things.

But to have a very fair *Chalcedony*, you must perform a second operation, to join to the first, by taking four ounces of *tartar* calcin'd, one ounce of chimney soot well purified, one quarter of an ounce of *crocus martis* calcin'd with *sulphur*, mix  
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the whole together, then put it into the melted metal at five or six different times; otherwise the impetuous swelling of the metals would break the pot, and the whole would be lost; which may be avoided by putting it in by little and little, stirring it each time well, that the matters may incorporate; also make the pot boil, and let it stand twenty four hours. After which time you may work it into what you please.

Which set into the furnace to whiten, and see if the glass please you, if it be green without, and blue, white, red, yellow, and of all other colours, like jasper and oriental agate.

If looking on it obliquely, it be red like fire, and held to the sun, it shews the colours of the rain-bow by reflection of the rays; if so, then it is fit to make all sorts of vessels, which may be polish'd at the wheel.

If it be pale and clear, more calcin'd tartar and foot must be added to it, as before, stirring it well to make it incorporate; then let the glass stand and purify several hours, and then you may work it, as you please.

*Chalcedony* is much us'd for the effigies of Kings and Princes, for heads, cups, and many other vessels; principally for seals, because it is easily engraven, and the wax will not stick to it.

*A second species of CHALCEDONY finer than the former.*

1. Put a pound of *aqua fortis*, and three ounces of coppel'd silver, granulated into a glass body, in order that it may be the better dissolv'd.

2. Put also a pound of *aqua fortis*, and five ounces of mercury well purified, and pass'd through a glove into another glass body, and close it well.

3. Put also a pound of *aqua fortis* with two ounces of *sal armoniac*, into another glass vessel to be dissolv'd.

When it is dissolv'd, add to it *crocus martis*, prepar'd *feretto* of Spain, leaves of copper calcin'd, by means of sulphur, of each half an ounce; reduce the whole into powder, putting them in one after the other, and by little and little, for fear the matter should break the vessel.

4. Put one pound of *aqua fortis*, with two ounces of *sal armoniack* into another earthen body, and when the whole is dissolv'd, add successively as before of good crude antimony, of blue enamel, such as is us'd by painters, of red lead, and of vitriol well purified, each half an ounce, all of them well pulveriz'd; these also must be put in by little and little as before, for fear of breaking the vessel, then close it well.

5. Put also one pound of *aqua fortis*, and two ounces of *sal armoniack* into another glass body, and when dissolv'd, add two ounces of zaffer prepar'd, a quarter of an ounce of *manganese* of Piedmont, also prepar'd, half an ounce of thrice calcin'd copper and an ounce

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of *cinnabar* ; reduce all to a fine powder, and put them in by little and little into the vessel, taking care that the powders don't by too much swelling break the vessel, then close it well.

6. Put a pound of *aqua fortis*, and two ounces of *sal armoniac*, into a sixth vessel of the same bigness as the rest, and as soon as it is dissolv'd, cast in two ounces of *ceruss* by little and little, for that will also cause a fermentation. Then add the like weight of painter's red lake, and as much of iron scales from the anvil, putting it in by little and little, for the reasons before mentioned ; and in a word proceed very slowly in all these operations, stopping all the vessels well.

Set all these vessels on a gentle fire of ashes, or in a warm bath, to hasten the solution of the materials, they must be stirr'd at least six times a day, for twelve days, in which they must continue in that heat, that the *aqua fortis* may the better penetrate the powders, and they communicate their tinctures the better to the glass. The twelve days being ended, put the whole into a large glass crucible, and lute it well for fear of breaking, pouring them gently in out of the six matrasses one after the other, having first well stirr'd each of them ; then set this cucurbit on a gentle ash fire, and having fitted a head and receiver to it, and luted the joints well, then gently distil all the *aqua fortis* that is in the body, for the space of twenty four hours, making a very gentle fire towards the end, otherwise the powders may be spoil'd by too much heat, and the spirits which ought to remain in the powder, would pass into the receiver.

Then they will remain at the bottom of the vessel of a yellowish red colour, which keep in a glass well stopp'd for tinging glass or crystal, which is yet better.

The third and last way of making a CHALCEDONY. This though something more tedious surpasses the two other in beauty.

1. To make this preparation : Take the *aqua fortis*, of which put one pound into a glass matrass, with four ounces of leaf silver to dissolve, then stop the matrass.

2. Put a pound of the same *aqua fortis*, with five ounces of mercury purified with salt and vinegar, after the following manner,

Put common salt into a wooden dish, sprinkle it with vinegar, and add to it a little common fair water to make it dissolve, put in the mercury, and stir it well with a wooden pestle to draw out the blackness, repeat the washing them often with salt and vinegar, till there be no more blackness ; then dry them with warm linen or cotton, and pass it through a glove ; then it will be purified and fit to put into the *aqua fortis*. When it is dissolv'd, stop the matrass and keep it.

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3. Take another glass body, put into it another pound of *aqua fortis*, with three ounces of fine silver calcin'd.

Amalgamate the *silver* with the *mercury*, as the gold smiths usually do (See AMALGAMATION) and put it into a crucible, with its weight of common salt purified.

Then set the crucible on hot coals, that the mercury may evaporate, and that only the silver may remain at the bottom, which will be purified and calcin'd.

Then add to that calcin'd silver, an equal weight of common salt purified as before, mix them well together, and set them over the fire in a crucible to calcine them again; then wash them well with warm water to take out the salt, and afterwards put this silver into a glass vial filled with common water, boil it, till one fourth of it is consum'd, then let it cool and settle to the bottom, after that decant off the water, and put more upon it.

Repeat this process with fresh water three times, and at the fourth dry the silver, and put it into the *aqua fortis*, and stir it well and stop the matrass.

*The method of purifying common SALT, is as follows: Dissolve sea-salt* in a convenient quantity of common water, boiling it for the space of two hours; then let the water rest, that the earthy part of the *salt* may settle to the bottom; then filter the water and evaporate it in an earthen vessel, or rather in a glass cucurbit, till the *salt* remain dry at the bottom.

Dissolve this *salt* again, making the water boil, then let it stand for the dregs to settle, after which filter it and evaporate it as before; which you must continue to do, till there are no more *fæces* or dregs, and it will be well purified and prepar'd.

In order to continue the preparation of the materials.

4. Put a pound of *aqua fortis* into a glass matrass, and add three ounces of purified *sal armoniac*; that is to say filtered and whitened, till it leave no *fæces* or dregs, as has been shewn in common *salt*; then dissolve a quarter of an ounce of silver in that water, and stop the vessel well.

5. Put also another pound of *aqua fortis* into another glass matrass, with three ounces of purified *sal armoniac*, that is to say, filter'd and whitened till it leave no *fæces* or dregs, as has been shewn as to common *salt*; then dissolve a quarter of an ounce of silver in that water, and stop the vessel well.

6. Put also another pound of *aqua fortis* into another glass matrass, with two ounces of *sal armoniac* when it is dissolv'd, put into that water *cinnabar* and *crocus martis* calcin'd with sulphur as above; of *ultramarine* and *feretto* of *Spain* prepar'd, of each half an ounce, having reduc'd all to a fine powder; this must be put in by little and little, for fear of breaking the vessel by the fermentation; which they make with the *aqua fortis*, then stop the matrass.



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7. Put a pound of *aqua fortis* into another matrafs, and dissolve in it two ounces of *sal armoniac* as before; add to it of *crocus martis* calcin'd with calcin'd tin, known among the glafs men, of *zaffer* described and *cinnabar* each half an ounce, powdering them all very well, putting them in by little and little, as before, then stop the matrafs.

8. Put also another pound of *aqua fortis* into another matrafs, and dissolve in it two ounces of *sal armoniac*; then add an ounce of small leaves of copper calcin'd, half an ounce of scales of copper thrice calcin'd, half an ounce of *manganese* of *Piedmont* prepar'd, and half an ounce of scales of iron, which fall from the smith's anvil, the whole being reduced to a fine powder; which throw in by little and little as before, then stop it well.

9. Put another pound of *aqua fortis* into another glafs body, and add to it two ounces of *sal armoniac*, the dissolution being made, put to it half an ounce of red lead by little and little, and one ounce of scales of copper, half an ounce of *crude antimony*, and as much *caput mortuum* of vitriol purified, all being reduc'd to a fine powder; then stop the matrafs.

10. Put another pound of *aqua fortis* into another glafs matrafs, with two ounces of *sal armoniac*, add to this water orpiment, white arsenic and painters lake of each half an ounce; let the whole be finely powder'd, put them into a matrafs by little and little as before, and stop it up well.

It has not been repeated at each operation, that you must set your matrafs on an ash furnace over a gentle heat, or in a warm bath to hasten the solution of the materials; because it has been said, that it must be always done in the preparation of these things, which are for tinging the first species of *Chalcedony*.

All the nine matrasses mentioned in this process, must remain fifteen days in the same heat, and be often stirr'd daily, that the water may the better operate on the materials, subtilizing them, and well opening their tinctures.

Then put all these materials with the *aqua fortis* into a large glafs body, by little and little, that they may unite well together; close the body, and set it on the same heat, stirring it well for six days.

After this, take a large glafs cucurbit well luted half way up the body of it, and set it on an ash furnace, put into it all the materials out of the body; fit a head and receiver to it, lute the joints well, and distil it for twenty four hours over a gentle fire, lest the colours should be spoil'd, that the water may pass gently over, and the spirits remain in the powder, which of green will become yellow.

Thus putting that powder in the requisite dose (as has been taught in the first species of *Chalcedony*) into purified metal,  
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made of broken pieces of crystal, and not of *frit*; and adding to it in its due time calcin'd *tartar*, chimney foot, *crocus martis* made with vinegar, as has been directed, and these materials will give an opacity to glass, which in twenty four hours time may be wrought, managing it well with proper tools and often beating it, and you will have things of an extraordinary beauty, greater than can be imagin'd.

**CHARGE**, { [in painting] is an exaggerated repre-

**OVER-CHARGE**, { sentation of any person, wherein the likeness is preserv'd, but withal ridicul'd.

Few painters have the genius to succeed in these *Charges*, the method is to pick out and heighten something already amiss in the face, whether by way of defect or redundancy; thus v. g. if nature has given a man a nose, a little larger than ordinary, the painter falls in with her, and makes the nose extravagantly long, or if the nose be naturally too short, in the painting he makes it a mere stump, and the like of the other parts.

**CHARITY**, is represented in painting, &c. by a woman all in red, a flame on the crown of her head with an infant sucking, on her left arm and two other standing up, one of which is embraced with the right.

The red colour denotes *Charity*, the flame signifies that *Charity* is never idle, but always active; the three children shew the triple power of *Charity*, for *Faith* and *Hope* without her signifies nothing.

**CHASTISEMENT**, is represented in painting, &c. by a severe furious fellow with an ax in one hand, as much as to say he will give but one blow, and a lion by him worrying a bear.

The ax is a token of *Chastisement*, the most severe as is the lion in that posture. The King of *Tenedos* made a law, that whoever committed adultery should be beheaded, and did not spare his own son.

**CHARON** *Pluto's* ferriman, who carries souls over the three rivers of hell, *Acheron*, *Cocytus* and *Styx*, is describ'd old, yet exceeding robust and strong, clothed with a black mantle, hanging loosely over his shoulders; and also sometimes with long curl'd black hair, and clad in a robe of cloth of gold. By *Charon* is signified *Time*, and whereas he is suppos'd to have the transportation of souls, from one side of those rivers to the other, is intimated that so soon as we are born, and brought forth into the world, it doth carry it along by little and little unto our deaths; and so setteth us over those rivers, whose names by interpretation signify sorrowfulness, for that we pass this life in misery and adversity.

**CHASTITY,**

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CHASTITY, is represented in painting, &c. by a modest, honest faced woman, holding a whip in one hand, as if she would correct herself, clothed with a white robe; on her girdle is written *castigo corpus meum*, I chastise my body. At her feet *Cupid* lies conquer'd with his bow broken and he blinded.

The whip denotes chastisement, the *Cupid* with his bow broken that no concupiscence has dominion over her.

*The way to make CHINA, or fine Earthen-ware; how to Enamel, Paint, and Gild them.*

Porcelaine, China, or fine Earthen-ware, is enamell'd with our white stuff, which is already prescrib'd for metals; and its painting the same, and of such colours as we have proposed for enamels.

The custom of enamelling on earthen-ware is of greater antiquity than that on metals; for in the time of *Porfenna*, who generously undertook the restoration of *Tarquin* to the Roman government in the Consulate of *Valer. Publicola* and *Horat. Pulvilius*, ann. mund. 3444, five hundred and four years before the coming of Christ, or thereabouts, the practice of enameling on ware was used in the estates of that prince; and what gives us very good reason to believe this is the name *Porcelane*, which has an affinity to *Porfenna*, though alter'd by the corruption of time. So it is also call'd *Fayence* from *Fayence* in the duchy of *Urbino*, where in the time of *Michael Angelo* and *Raphael Urbino*, this art was practised.

And as the secrets of nature are daily more and more discover'd, so has time employ'd the invention of man to improve this, and make it more excellent, not only condescending to enamelling, but proceeding also to painting and portraying thereon several curiosities, to which at length are added the ornaments of gilding.

These pieces of ware are of a very general use over all the world, as for ornaments over chimney-pieces, on cabinets and tables, or boards. The choicest come to us from *China*, and next to them those done at *St. Cloud* and *Rouen*; but there are very good made in *Holland*, at *Savonne* in *Italy*, and several other places in *France*.

The painting and enamelling on these, is what we are properly obliged to take notice of in our art; however, we shall slightly touch upon the composition and moulding the ware, and for this we will prescribe fine and delicate methods sufficient enough to answer the satisfaction of such as employ themselves in this art, and of those persons whose curiosity leads them to enquire after things, whereof they are not already inform'd.

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*The furnace for making of CHINA* must be large, with an opening proportion'd to the vessel you are to place therein; of these there are several sorts, but the most commodious must be made as follows.

You may shape this furnace round or square, but the square is best, because of the opening; it must be made of good brick, and such stuff as can mostly endure the fire, of what bigness you please, with three divisions; the lowest for ashes must be a foot high, that the air may be communicated through its opening to the fire; the middle story is for the fire, and must be underlaid with a very good grate, to separate it from the under story, with an opening for the fuel, and be vaulted above, about a foot in height. According to the size of your furnace, this vault must be made, like that of an oven, and have an hole in the middle, of the same shape as the furnace, round or square, and proportion'd to its bigness, through which the flame may transmit itself to the uppermost story, where the vessels are put to bake in; this last story is to be at least two foot high, and its opening fourteen or fifteen inches, to put and draw the vessels easily in and out; the top must be vaulted too with a round or square hole, and over that a funnel, for the conveniency of the flame and smoak which it draws out.

All the opening, especially to the two uppermost, must be of strong brick, or crucible earth, or rather of iron, well luted within side, which must shut and open easily, and be very exact and fit, that the fire may not suck in any cold air, which might break the vessels.

This furnace will serve also for many other uses, as to melt, reverberate, calcine, cement, and several sorts of work in the laboratory of *chymistry*; because in it all the degrees of fire may be found, by the help of the lower opening, and the funnel of the chimney.

You may also for baking your China, make use of the furnace hereafter describ'd, where we discourse of painting on glass, putting thereinto your vessel of crucible earth for baking the ware in, and then cover'd over with a vaulted coverlid, with a hole at top to let out the flame and smoke of the *reverberatory fire*; for this reason there will be no occasion in this sort of furnace for any other opening, because the baking of vessels with your ware, are put in at top before the coverlid is laid on, and so the fire circulates about it, and it becomes very red, whereby the China-ware is baked, as is done in baking of pipes.

*To make the Stuff for CHINA-WARE.* The composition for this must be very fine, because of the ware, and not such as is used for ordinary vessels, we will therefore prescribe the manner

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manner of making it, to prevent the unsuccessful attempts of such as may be ignorant.

For this you must take of shells of every sort which are white and transparent, grind them well on a marble, then scarce and reduce them to an impalpable powder.

To make your paste of this powder, first dissolve an ounce of very white *gum arabick* in a pail of water; when 'tis well dissolved and mixt with the water, dissolve therein about a quarter as much quick lime as your powder weighs; then stir and mix it very well, and afterwards put in the powder and stir all together, and knead it as they do mortar. Of this stuff form your vessels, according to the different sorts you desire; let them half dry or more, in the air, before you polish them with your smooth instrument of copper or iron for that purpose, and so leave 'em until they dry thoroughly. Being very well smoothed and dried, glaze them over with your white enamel, prepared as hereafter directed, and so set them dry in the furnace to bake and finish; where having kept them a convenient time, let the fire go out of it self. When the furnace is cold, take 'em out and paint them, and put them in again to bake a second time, observing what directions have been already given concerning these matters; and when the fire is gone out, and the furnace cold, you have the ware in perfection ready to take out for use.

You may make your China-ware also of pure earth, let it not be red tho', but white or gray; you may try the sufficiency of it after 'tis prepar'd, by baking some beforehand; and when it comes out of the furnace sound and uncracked, 'tis good and fit for your purpose.

The preparation consists in drying well, and reducing it to a very fine powder; then put it into fair water, wherein has been already dissolved a little gum arabick; but most of those that make it, employ only water without gum. After this, you make your dishes, set 'em to dry, polish, glaze, bake, paint, and finish them as before; all which, those who work at them know better than I can express it.

*How to Enamel CHINA.* For this, take of the milk-white enamel, grind it very fine, as painters do their colours; put the powder afterwards into a glass cucurbit, pouring some *aqua-fortis* thereon; let it digest a little to cleanse off its impurities, and become fine and transparent; then pour off the *aqua-fortis*, washing the powder in water over and over again; grind it afterwards with a little gum-water on your marble, and so glaze the vessels with it within and without; dry them in the air, and bake them as before in the furnace.

Or you may heat the vessels to a redness in the furnace, and melt the enamel: when it is in a perfect fusion, dip the smaller

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ler vessels therein, and pour of it on the larger, for they will take no more on them than will serve them; set them by turns in the furnace, stopping it very well to avoid the air; bake, cool your furnace, and finish them as before; then take out the dishes, paint and bake them over again, observing all the former directions.

*To paint CHINA.* This is done as the enamel, but much more easily, the figures being only just dash'd over in comparison to them; however you must grind your colours with oil of spike on the marble, as has been already said, and so paint on the dishes story, landscape, or any other fancy: but you must never expect to have them so complete and handsome, as those painted on the enamel'd plates, because the former are finish'd standing, and so enlarge in length or breadth; whereas the other are done on flats, and lying; besides, the dishes are for the most part round, and not so easily painted, for if they could be as neatly done as the enamel, they would be excessively dear.

*To Gild CHINA.* You must first grind some *shade-earth* on a marble, with linseed-oil, prepar'd as shall be shewn anon, with which trace out your figures, which must be two whole days a drying; after this, apply very thin leaf-gold, and with a sharp graver, shape the figures, and then put the dishes in an oven, as soon as the batch of bread is drawn out; let the heat be no greater than one's hand may endure, else the vessels would crack; leave them in it for two or three hours or more, if the oven be not too hot; you may else make use of your furnace, by giving it the same moderate degree of heat, as experienced persons are well acquainted with.

*Another way.* This is much more handsome and lively, besides that it can't be effaced; you may with it gild vessels entirely, or border, or give them any lustre you think convenient for ornament, and it will look as well as fine gold.

You must first wet over the places you would gild with gum-water lightly, then apply your leaves, and so let them dry: this is enough for plain gilding; but if you would have it carved or figured, you must make use of a steel graver, and afterwards bath the gold with water, wherein borax has been dissolv'd, powdering it in the mean time with crystalline powder, or milk-white enamel reduc'd to a very fine powder; then set the dish on a reverberatory fire to melt and be polish'd; thus you'll have as fine a piece of ware as can be.

*The way to prepare Linseed-oil for Gilding of CHINA.* Take a *Paris* pint of linseed-oil in an earthen pot which will hold about two *Paris* pints; put this on a fire, and when it begins to boil, throw in twice the bigness of a small egg of *gum-arabick*

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*bick* pulveriz'd; stir all well until it be dissolved; then put in an onion of an ordinary size, and the like weight of garlick cut small; when the oil boils well, and swells up by the force of the good fire which must be underneath, pour it out into another such pot, and so in and out of each pot to the other, until all be very well mixt; then put it on the fire again, adding half an egg-shell of powder of mastick, and stir it very well; as soon as it boils again, it will foam and have a great froth, which must be scumm'd off; and then take it off the fire, and brew the ingredients together, with the two pots as before; continue to do thus with it, or stir it on the fire, until it rise no more.

This done, take a very dry toast of white bread to take off the grease (the oil still boiling) and when you put in the toast, you must at the same time put in some pin-duft; stir all together, and let it stand for twenty-four hours afterwards; strain the oil through a linen-cloth, in which is some very fine sand, the better to filtrate it, and take off the grease, and so you'll have it pure and clear, which bottle up for your use.

Or you may (both ways being good enough) first mix with the oil two ounces of gold litharge pulveriz'd, adding the gum arabick as soon as it begins to boil; and to purify it, let it filter through a linen-cloth full of sand, while its hot, into a glass-bottle, wherein is already half an ounce of fine camphire powder, shaking the bottle very well until the oil be cold; afterwards lay it in the sun for fifteen days, and it will be entirely purged, and the longer 'tis kept will be the better.

*The imitation of CHINA or PORCELANE ware upon tea-tables, tea-boards, &c. upon gold and silver grounds.* After the tables or other utensils have been prepared as directed, mark out the designs upon them, make ovals or rounds upon them in a good disposition, so as to be uniform, or well adapted to the design, that they may answer one another in a regular manner; then paste on some paper in proper places, and when the paper is dry, draw your designs upon them, and paint them with water colours; then with a brush lay gold or silver size, and when that is near dry, lay on leaf gold or silver; and when all is dry'd, varnish over with the strongest varnish, except only the ovals or circles of painting, for those must be done with the white varnish, which is so transparent, that all the painting will appear through it.

If you lay on a gold ground, or any colour darker than that, then let your painting be *blue* and *white*; or if it is silver or light ground, then use the most fiery colours in your paintings.

*To take off the figure from any piece of CHINA-WARE, tho' the person has not been acquainted with drawing.* If there  
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be upon a dish, plate, cup, &c. any figures that you like and would take off, you must lay a piece of oiled paper over them, so as to hold the piece steady till you can trace out the lines of the figures; then lay the oily paper on a paper black'd on one side, and the black'd paper on a clean paper; then trace the lines with a pen or blunted point of a needle, till the lines are all impress'd on the white paper, and draw them over with a black lin'd pencil, and mark the shades where they separate from the light parts of the colour, that so you may lay on your colours as you see them painted on the *China*-ware; then cut out the figures close to the out-lines, and fix them upon your ground of whiting and size, or size with ground chalk, with thick *gum arabick* and water; and when they are quite dry, paint them, the lighter parts in water colour, and the shady parts with varnish mix'd with the darker colours; when these are dry, wash all over with the white varnish before the fire, but take care that it be not so nigh the fire as to make the varnish rise in blisters.

When the varnish is dry, lacker it again with the same varnish, and repeat this a third time; then scrape some tripoli very fine, and with a soft rag dipt in water, take up a little of the *tripoli* at a time, and polish it by gentle rubbing till it is smooth; then wash off the *tripoli* with a soft sponge and water, and then wipe it off with a dry fine cloth; and when it is thoroughly dry, if it be a white varnish, clean it with whiting and oil; and if a black varnish, with lamp black and oil.

But the common way is to cut out prints, and paste them on such parts as is thought fit, and then to colour them with water colours, and to varnish them with white varnish.

This is an easy way of painting, because the shades of the prints, when you lay on a transparent water colour, will give the light and shade that colour to your purpose, without using a dark and light colour.

**CHOLER** is represented in painting by a meagre youth of a fallow colour, with a haughty look, being almost naked; holding a drawn sword in his right hand; on one side a shield with a flame in the middle, and a fierce lion on the other side.

Lean, because heat predominates, which the shield denotes; his yellow colour shews his choler; the drawn sword, his hastiness to fight; his nakedness and his impetuous passion does not suffer him to provide for himself: the lion his animosity.

**CHOROGRAPHY** is represented in painting, &c. by a young lady in a changeable colour'd habit, plain and short; in her right hand a measuring square, a globe on the ground with a little part designed; in her left compasses.



The changeable habit denotes the different taking of situations ; her shortness signifies the taking plans of dominions more briefly, when they take the least part for the greatest ; the instrument, the taking by it the limits of every dominion ; the compasses denote, the setting them to distinguish the confines from one another.

**CHROMATICK** [in painting] a term used to signify the colouring, which makes the third part of the art of painting.

**CHRYSOLEITE**, a precious stone of a yellow colour. The *Chrysolite* is the *Topaz* of the moderns.

**CHRYSOLEITE**, is also a general name which the ancients gave to all precious stones, in which the yellow or gold was the prevailing colour.

When the stone was green, they call'd it *Chrysoprasin*, the red and blue too had their particular denominations, which express'd their colour, the gold being signified by *Chryso* ; which still began the name.

The modern jewellers call that a *Chrysolite*, which the ancients call'd a *Topaz* or *Chrysopras*, which is a precious stone, green and diaphanous, some of which cast a lustre of gold ; this stone is so hard, that it will easily endure the file, and sometimes there are pieces of them found big enough to make statues of, witness that of *Juba* King of *Mauritania*, made in honour of Queen *Arfinoe*, wife of *Ptolemæus Philadelphus*, of the height of four cubits.

*To make a paste for an oriental Chrysolite.* To imitate this stone, take two ounces of natural crystal prepar'd, eight ounces of minium in fine powder, add to it twelve grains of *crocus Martis* made with vinegar, mixing the whole well together.

Then put the whole into a crucible, and set it in a furnace, leaving it there a little longer that it may have time to purify from the lead.

Then will you have a paste for the oriental *Chrysolite*, which will appear very admirable, set with a foil in gold.

*The way to make CHRYSOLEITE.* Take ten ounces of our powder of natural crystal and *Saturnus glorificatus*, (which see) to which add one ounce of *crocus martis* prepar'd ; the whole reduc'd to fine powder, well mix'd, and put into a crucible covered and luted, and bake it as directed for other of the like metals, and you will have a fine *chrysolite* colour, which will be of the native green.

**LODOVICO CIGOLI** or **CIVOLI**, born in the year 1559, studied *Andrea del Sarto* and *Correggio* ; liv'd at *Florence* and *Rome*, excell'd in history, died in 1613, aged fifty four years.

## C I N

**GIOVANNI CIMABUE** of noble descent, the father of the *first age* or infancy of modern painting, a disciple of certain ordinary *Greek* painters brought to *Florence*, born in the year 1240, where he liv'd, excell'd in history and architecture, died in the year 1300, aged sixty years.

He was of the family of the **CIMABUE**, in those days reputed noble, and being a promising child was sent to school to the monastery of *Santa Maria novella*.

But instead of minding his book, he spent all his time in drawing of men, horses and the like upon paper or the backside of his books.

Much about this time those who govern'd in *Florence*, invited some painters out of *Greece*, that the art of painting which was totally lost by the deluge of calamities, which for divers hundred years had overwhelm'd *Italy*, and had ruin'd all the publick fabricks, and the product of the industry of the ancients, might be restor'd among the *Italians*.

There *Cimabue* following his secret inclination, us'd to get from school, and pass the whole day with those painters to see them work. So that at last his father perceiving how fond he was of that art, agreed with the *Greek* painters to take him under their care, which they the more readily did, judging he was very likely to succeed in his profession.

Accordingly, in a short time, he surpass'd his masters both in design and colouring, for they not at all attentive to improve their art, had contented themselves with a plain, flat manner, as may be seen in those of their works that have been preserv'd to our time; but *Cimabue* though he imitated them, yet he had a much freer way, as appears by his works that remain.

**CINNABAR**, a mineral stone, red, heavy, and brilliant, found chiefly in the quick-silver mines; call'd also vermilion.

The ordinary vermilion is nothing else but *Cinnabar* ground up with spirit of wine and urine.

*Cinnabar*, is either *native* or *faëtitious*.

The *native* or *mineral Cinnabar*, or vermilion, which is that above mentioned, is found in most places where there are quick-silver mines; yet it is true also, that it has mines of its own, those in *Spain* are very famous; the *French* also have some of them in *Normandy*.

It may be esteem'd as marcasite of quicksilver, or rather as quicksilver petrified and fixt, by means of sulphur and a subterraneous heat. Chymistry being found to reduce it without much trouble or loss to the nature of mercury, each pound of *Cinnabar* yields fourteen ounces of mercury.

Accordingly, the principal property and use of this mineral, is to yield a most excellent mercury.

## C I N

The best mineral *Cinnabar* is of a high colour, brilliant and free from the stone.

*Faëtitious* or *artificial Cinnabar*, or vermilion is form'd of a mixture of mercury and sulphur, sublim'd and thus reduc'd into a kind of stone.

The best is of a high colour, full of fibres like needles.

*The method of preparing faëtitious CINNABAR.* They take six ounces of *sulphur*, and eight of *quick-silver*, they mix them well, then set them on the fire till part of the sulphur is consum'd, and the powder remain black.

After this, it is sublim'd once or twice in open pots, at the bottom of which the *Cinnabar* remains, very heavy, and streak'd with the lines or needles, some red, others brilliant like silver.

This is us'd by painters as a colour, it being a very vivid red, but not drying without some difficulty; *Cinnabar* or *Vermilion* is rendred more beautiful by grinding it with gum water, and a little saffron, those two drugs preventing it from growing black.

There is likewise a BLUE CINNABAR, made by mixing two parts of *sulphur* with three of quicksilver, and one of *sal armoniac*; these being sublim'd, produce a beautiful blue substance, whereas quicksilver and sulphur alone produce a red.

*To purify CINNABAR or VERMILION.* *Cinnabar* being a compound of mercury and sulphur, must be divested of the impurities it contracts from those minerals, which impurities darken its lustre, and cause it to change.

Grind *Cinnabar* in stone with fair water, on a marble or porphyry, put it into a glass or earthen vessel to dry, then put urine to it, and mix it so that it be thoroughly wet and swim; then let it settle, and the *Cinnabar* being precipitated or fallen, pour off the urine by inclination, and put fresh in the room of it, leaving it so all night, and repeating the same change for four or five days, till the *Cinnabar* be thoroughly purified.

Continue the process with beating up the white of an egg, which mixing with fair water, pour it upon the *Cinnabar*, and stir the whole about with a walnut-tree stick; change this liquor two or three times as above, and keep the vessel close stopp'd up, or closely covered for fear of dust, which would spoil the *Cinnabar*, and when you would use it, temper it with gum water, with this it will not change its colour.

*Another way.* First pulverize the *Cinnabar*, and then grind it on a porphyry with the urine of a child, or with brandy, and drie it in the shade.

If you would intirely divest it of all its obscurities, and give it a brighter or redder countenance, infuse in the brandy a little saffron, or put in a little urine and grind the *Cinnabar* with this liquor.

*Of dying a Cinnamon colour.*

I. *To dye a Cinnamon colour.* Take water a sufficient quantity, *madder* a pound and half, nut galls a pound, fustick a pound, red wood two ounces, boil all in your cauldron, after enter twenty yards of cloth and handle it, boiling it strongly two hours, cool it, and put into the liquor copperas four ounces; enter your cloth again; boil and handle, boil a quarter of an hour, and cool it, then put in copperas two ounces more; enter your cloth again, and handle it, and let it boil a quarter of an hour, then cool it, and it will be a good *Cinnamon* colour; the less copperas the lighter it will be, the more copperas the deeper.

II. *Another Cinnamon colour.* Take water a sufficient quantity, dry rotten oak half a bushel, *madder* two pounds, boil them well, and enter twenty yards of cloth; which handle well, and boil three hours, still handling it; take it out of the cauldron and air it, and if need be, add a little more water to the dye, and put in copperas twenty four ounces; enter your cloth again, take it out and cool it, and if it is not sad enough, put it in again with more copperas.

III. *Another way of dying Cinnamon colour.* Take water a sufficient quantity, nut galls bruised small four pounds, fustick, red wood ground, of each a pound, boil them all together; then enter your cloth and handle it well, for fear of spotting, and boil it two hours and cool it, then put in to sadden it copperas two pounds; then it will dye forty eight or fifty pounds of wool, yarn, flannel, bays, cloth, &c.

IV. *Another Cinnamon colour.* Take water a sufficient quantity, of *madder* two pounds, of red-wood ground a pound, boil them together for an hour; then enter forty pounds of wool, yarn, cloth, &c. and boil again an hour, take it up and air it, put in copperas three pounds; which when melted, put in the cloth again, make it boil.

V. *Another Cinnamon colour.* Take water a sufficient quantity, crust *madder* three pounds, nut galls bruised small, fustick, red-wood ground, of each a pound, rotten oak wood, tanners bark, of each half a pound; boil all together; then enter twenty yards of cloth, and boil an hour and half, after which cool and sadden with copperas eight ounces, and if that deepens it not enough put in more.

VI. *Another Cinnamon colour.* Take water a sufficient quantity, nut galls, *madder*, of each a pound, fustick twenty four ounces, redwood ground six ounces, boil and enter twenty yards of broad cloth, cool and sadden with copperas four ounces.

CIVET, is a perfume produc'd by an animal call'd a *Civet Cat*.

## C L A

This animal pretty much resembles our *Cat*, excepting that its snout is more pointed, its claws less dangerous, and its cry different.

The perfume produc'd by this animal, is form'd like a kind of greafe or thick scum in a sort of bag under his tail. This *grease* is gathered from time to time, and still abounds in proportion as the animal is fed.

Before any of these animals were seen in *Europe*, or it was known how the perfume was gathered, it was (according to the relations of travellers) suppos'd to be the sweat of that animal irritated and kindled into a rage.

That the method of performing it, was by inclosing the animal in an iron cage; and whipping them a great while with rods, then gathering the sweat or foam of the animal with a sort of spoon, through the iron bars from between the thighs.

But since we have by experience been taught better, and that the perfume *Civet*, is only a thick unctuous humour, secreted by certain glands, between the two tunicks of the bag in which it is amass'd, under its tail, beneath the *anus*.

There is much *Civet* produc'd in *Bassora*, *Calicut* and other places, where the animal that produces it is found. Though a great part of the *Civet* we have is furnish'd by the *Dutch*, who keep and bring up a considerable number of *Civet Cats*.

Besides the *Civet* from *India* and *Holland*, there is also from *Brasil* or *Guinea*, like that of *India*, and an occidental *Civet*, which bears no resemblance to it.

*Civet* must be chosen new, of a good consistence, a whitish colour, and a strong disagreeable smell.

*Civet* is adulterated by mixing with it the gall of an ox, and *storax* liquified and wash'd, or by the addition of honey of *Crete*.

Another way is, by taking the pure pulp of *raisins* of the sun four ounces, musk reduc'd to a fine powder half an ounce, which being well mixt together, nine ounces of *Civet* is added and mix'd again, and then digested in a bolt head in a sand heat for twenty days; and when it is cold, it is taken out, stirred and mixed well together, and kept in a jar-glass close covered with bladders.

Another way. Take liquid *storax*, honey, ox-gall, fine pulp of figs of each an ounce and quarter, musk in fine powder half an ounce, choice *Civet* ten ounces; mix them well in a mortar, put them into a bolt head, and digest them for twenty days as before.

CLARO OBSCURO, } in painting is the art of distributing  
CLAIR OBSCURE, } to advantage, the lights and sha-  
CHIARO SCURO, } dows of a piece; both with regard  
to the easing of the eye and the effect of the whole piece.

Thus

## C L A

Thus when a painter gives his figures a strong relieve, loosens them from the ground, and sets them free from each other, by the management of lights and shadows, he is said to understand the *Clair Obscure*.

The *Claro Obscuro* makes one of the great divisions, or branches of painting, the whole of a picture being resolvable into *light* and *shadow*.

The doctrine of *Clair Obscure* will come under the following rules.

Light may be either considered in regard to itself, or to its effects, the place wherein it is diffus'd, or its use.

For the first light is either *natural* or *artificial*, *natural light* either comes immediately from the sun, which is brisk, and its colour various according to the time of the day, or 'tis that of a clear air, thro' which light is spread, and whose colour is a little bluish, or a cloudy air which is darker; yet represents objects in their genuine colours with more ease to the eye.

*Artificial light* proceeds from fire or flame, and tinges the object with its own colour, but the light it projects is very narrow and confin'd.

For the second, the effects of light are either *principal*, as when the rays fall perpendicularly on the top of a body without any interruption, or *glancing*, as when it slides along bodies, or *secondary*, which is for things at a distance.

3. For the *place*, it is either the open campagne, which makes objects appear with great softness, or it is an inclos'd place, where the brightness is more vivid, its diminution more hasty, and its extremes more abrupt.

4. For the use or application, the light of the sun is always suppos'd to be without, and over against the picture; that it may heighten the foremost figures, the luminaries themselves never appearing, in regard the best colours can't express them.

The chief light to meet on the chief group, and as much as possible on the chief figure of the subject.

The light to be pursued over the great parts, without being cross'd or interrupted with little shadows.

The full force of the principal light to be only in one part of the piece, taking care never to make two contrary lights.

Not to be scrupulously confin'd to one universal light; but to suppose other accessory ones, as the opening of clouds, &c. to loosen some things and produce other agreeable effects.

Lastly the light to be different, according to the quality of things, whence it proceeds, and the nature of the subjects which receive it.

As for *shadows*, they are distinguish'd,

1. Into those form'd on the bodies themselves, by their proper relieve's.

## C L A

2. Those made by adjacent bodies, those that make the parts of any whole, and the different effects, according to the difference of places.

For the first, since the different effects of light only appear by shadows, their degrees must be well manag'd.

The place which admits no light, and where the colours are lost, must be darker than any part that has relievo, and dispos'd in the front.

The reflex or return of the light, brings with it a colour borrow'd from the subject that reflects it, and flies off at a greater or less angle, according to the situation of the reflecting body, with regard to the luminous one; hence its effects must be different in colour, and in force, according to the disposition of bodies.

Deepenings which admit not of any light or reflex, must never meet on the relievo of any member of any great elevated part; but in the cavities or joints of bodies, the folds of draperies, &c. and to find occasions for introducing great shadows, to serve for the repose of the sight, and the loosening of things, instead of many shadows which have a pitiful effect.

For the second, the shadows made by bodies, are either in plain and smooth places, or on the earth, wherein they are deeper than the bodies that occasion them, as receiving less reflex light; yet still diminish as they depart further from their cause, or on the neighbouring bodies, where they are to follow the form of the same bodies, according to its magnitude, and its position in respect to the light.

For the third, in shadows that have parts, the painter must observe to take for a light in a shadowed place, the teint or lustre of the light part; and on the contrary, for the shadow in the lightened part, the teint or lustre in the shadow; to make an agreeable assemblage of colour, shadow and reflex in the shadowed part.

But without interrupting the great masses of shadows, to avoid forming little things in the shadow, as not being perceiv'd unless closely look'd at; and to work as it were in the general, and at one sight.

Never to set the strong shadows against the light, without softening the harsh contrast by the help of some intermediate colour, though the mass of light may be plac'd either before or behind that of the shadow; yet it ought to be so dispos'd, as to illumine the principal parts of the subject.

For the fourth, the effects of shadows are different, as the place is either wide and spacious, as in those coming immediately from the sun, which are very sensible, and their extremes pretty abrupt; from the serene air, which are fainter and more sweet,  
from



## C L I

from the dark air, which appears more diffus'd and almost imperceptible; and those from an artificial light, which makes the shadows deep, and their edges abrupt; or as it is more narrow and confin'd, where the lights coming from the same place, make the shadow more strong, and the reflex less sensible.

CLAIR OBSCURE, is also us'd to signify a design, *con-CHAIR* O SCURO, consisting only of two colours, most usually black and white; but sometimes black and yellow, or it is a design only wash'd with one colour, the shadows being of a dusky brown colour, and the lights heightened up with white.

The word is also apply'd to prints of two colours, taken off at twice; whereof there are volumes in the cabinets of the curious in prints.

The word *Clair-Obscure* is a compound of two others, *Clair* is us'd by the *French* for those parts of a painting which reflect the most light; and comprehends not only the lights themselves, but also those colours that are luminous.

By *Obscure*, is meant not only all the shades, but also all the colours that are dusky.

CLEARNESS is represented in painting, &c. by a naked youth of a noble aspect, surrounded with a great splendour and brightness, with the sun in his hand.

His youth shews him acceptable to every body, and is said to be illustrious like the sun that illuminates every thing in the world.

CLEOPHANTUS of *Corinth*, made the next improvement upon *Ardices* of *Corinth*, who first attempted to fill up his outlines. But as he did it with one single colour laid on everywhere alike, his pieces, and those of *Hygiemon*, *Dinias* and *Charmas* his followers, from thence got the name of *Monochromata* (*viz.*) pictures of one colour.

FRANCES *de* CLEYN was a *Dutch* painter and master of the tapisstry works to King *Charles I.* at *Mortlack* for which he painted cartoons in distemper; he was very eminent for his invention, and made several designs that were extraordinary fine for painters, gravers, sculptors, &c. amongst which are cuts of some of *Ogilby's* books. He died at *Mortlack* a little before the restoration.

CLIO, one of the muses, the patroness and inventress of history, is represented in painting with a coronet of bays; holding in her right hand a trumpet, in her left hand a book, upon which may be written *Historia*. Her name is deriv'd from praise and glory.

**M** HENRY DE CLIVEN, or DE CLEF, painter of *Antwerp*, used this mark; he died *anno* 1589. So also did *Martin de Clef*.

## C L O

*Cl. Mell. in Sf. Romæ* signifies *Glaudius Mellanus*.

**CLOUDS, SKY, &c.** For colouring them, do as follows :

1. For a beautiful sky, fitted for fair weather, use *Bice* tempered with *white*, laying it in the upper part of the sky, (as you see proper) under which you may lay a thin or faint *purple* with a small soft brush, working the undermost *purple* into the uppermost *blue* ; but so as that the *blue* may stand clear and perfect.

2. For the horison, or near the same, lay a fine thin *masticot*, which work from below upwards, till it mix with the *purple* ; after which, you may take a stronger *purple*, making here and there upon the former *purple*, as it were the form of clouds as nature requires.

3. Upon the *masticot*, you may also work with *minium* mix'd with *cerufs*, to imitate the fiery beams, which often appear in hot and clear summer weather.

4. To imitate glory with a great shining light of a yellowish colour or the sun-beams, you must use *masticot* or *saffron* mixt with *red-lead*, and heightened with shell *gold* or the like.

5. A cloudy sky is imitated with pale *bice*, shading the clouds afterwards with a mixture of several colours ; a fair sky requires clouds of a greater shade, with *purple*.

6. The clouds in a rainy sky must be shaded with *indigo* and *lake* ; in a night sky, with *black* and dark *blue*, smoaky, making a blaze with *purple*, *minium* and *cerufs*.

7. The clouds, at sun rising or setting, must be made with *minium*, *cerufs* and *purple*, making scattering strokes underneath the clouds with *minium* and *masticot*, or *minium* and *saffron* ; so that the scattering upward may appear faint, and something fiery below afar off, near the landscape.

8. Make a fiery sky with pale *blue*, smoothing it downwards, which must be afterwards mingled with a strong *red-lead* mixt with *cerufs*, making long diminutive strokes like the sun-beams upon the *blue* sky, with which let fall some *purple* strokes, much like the said beams ; then sweeten one into another with a soft brush-pencil, wet in gum-water, not too strong.

9. Make a fair sky, by using fair *bice* alone, and tempering it by degrees with more and more *white* ; smoothing one into the other from above downwards, and shading it as you think proper, and as nature requires.

### Of dying CLOVE colour.

I. To dye an excellent Clove colour. Take water a sufficient quantity, *fustick* twenty four ounces, *crust madder* and *nut galls* of each a pound, *red wood* ground four ounces ; boil them, and enter twenty yards of broad cloth ; boil it two hours with a strong heat, handling it ; then put in *copperas* half a pound, *oak*  
(havings

*shavings* four ounces ; enter your cloth again, handle it well, boil it half an hour, and so cool it ; if you would have the colour sadder, put in more *copperas*.

II. *Another Clove colour.* Take water a sufficient quantity, joiners oak shavings four pounds, *madder* two pounds, *redwood* and *walnut tree leaves* of each four ounces ; boil them well, and enter twenty yards of cloth, which handle well, and boil it three hours, still handling it ; then take it out and air it, adding, if need requires, a little more water ; then take *copperas* thirty ounces, enter your cloth again, take it out and cool it, and sadden it, if need requires, with more *copperas*.

III. *Another Clove colour.* Take water a sufficient quantity, *nut galls* and *red wood* ground of each a pound, *fustick* and *madder* of each eight ounces, *sumach* four ounces ; boil all these together for an hour, then enter your cloth, &c. and boil an hour ; take it out, and put in *copperas* two pounds ; being melted, put in your cloth again, and let it boil. This will dye twenty pounds weight of wool, yarn, cloth, &c.

IV. *Another Clove colour.* Take water a sufficient quantity, *sumach* six handfuls, *fustick* three handfuls, *red wood* ground one handful ; boil all these two hours and a half, with twenty yards of broad cloth ; then cool and sadden with *copperas*, as you see fit.

V. *Another Clove colour.* Take water a sufficient quantity, *nut galls* two pound, *madder* two pounds, *fustick* a pound and a half ; boil all together, cool with a little water, then enter forty eight or fifty pounds of wool, yarn, cloth, &c. handle your cloth, and boil it two hours and a half ; then cool it, and sadden with *copperas* two pounds four ounces.

DON GIULO CLOVIO, born 1498, scholar of *Giulo Romano*, liv'd at *Rome* and in *Hungary* ; excell'd in miniature, history and portraits ; died in the year 1578, aged eighty years.

**I****E****F** HERMAN COBLENT has put this mark under the four Evangelists and other plates ; one of *David*, of *Judith* and *Lucretia* ; and afterwards *Adrianus Hubertus* used this mark with *excudit*.

COCHINEAL, a drug us'd by dyers in giving red colours, especially crimsons and scarlets.

It is brought to us from the *West-Indies*, but authors are not agreed as to its nature ; some taking it to be the grain of a tree, and others to be a kind of worm.

Of the first opinion is *Pomet*, and of the latter *F. Plumier*.

But it should seem that there is both a *Cochineal* that is a grain, and another that is a worm, tho' they have both been equally distant from the truth in the description they have given of it.

This

## C O L

This opinion is founded on the account given by *Dampier*, who gives a precise description of each kind; which if be not true, 'tis at least more likely than any opinion yet propos'd. His description of each is as follows.

The *Cochineal worm* is an insect ingendred in a fruit, resembling a pear; the shrub which bears it is five or six foot high. At the top of the fruit grows a red flower, which when mature, falls on the fruit; and that opening discovers a cleft two or three inches in diameter. The first then appears full of little red insects, having wings of a surprizing smallness, and which would dye and rot there if not taken out.

The *Indians* therefore spreading cloths under the tree, shake it with *Poles*, till the insects are forc'd to quit their lodging, and fly about the tree; which they cannot do many moments, but tumble down dead into the cloth, where they are left until they be entirely dry. When the insect flies, it is red; when it is fallen, black; and when dry, white, though it afterwards changes its colour.

There are whole plantations of the *Cochineal tree*, or *Tonna*, as the natives call it, about *Guatemala*, *Chepe*, and *Guexach* in the kingdom of *Mexico*.

*Cochineal grain*, or as *Dampier* calls it, *Sylvestris*, is a red berry, growing in *America*, found in a fruit, resembling that of the *Cochineal tree* or *Tonna*.

The first shoots produce a yellow flower; then comes the fruit which is long, and when ripe, opens with a cleft of three or four inches. The fruit is full of pippins or grains, which fall on the least agitation, and which the *Indians* take care to gather. Eight or ten of these fruits may yield about an ounce of grain.

This berry yields a dye, almost as beautiful as that of the insect; and a person may easily be deceived in them, though the first is the least esteem'd by much.

VIVANO CODAZZO, call'd VIVIANE, call'd DALLE PROSPECTIVE, born in the year 1599, scholar of *Augustino Tasso*, liv'd at *Rome*, excell'd in buildings and ruins, died in the year 1674, aged seventy five years.

£ STEPHEN COLBENSTAGH, *Sc. Romæ*. He engrav'd the paintings of *Domenicheno*, and used this mark.

ADAM COLONI, commonly call'd *the Old*, was a *Dutch* painter, born in *Roterdam*, but who resided a great while in *England*, and became especially eminent for his small rural pieces, cattel, country wakes, fire pieces, &c. he also copied many pictures of beasts after *Bassano*, particularly those of the royal collection, which are esteemed his best performances. He died in  
*London*

## C O L

*London* in 1685, and lies buried in *St. Martin's Church*, aged fifty one years.

HENRY, *alias* ADRIAN COLONI, was the son of the forementioned, he was instructed by his father and brother-in-law Mr. *Van Dieft*, and became a good draftsman, as a great number of academy pieces drawn by him testify; he often wrought upon the small figures of his brother *Van Dieft's* landscapes, and they received no small addition of beauty from what he did, especially when he strove to imitate the manner of *Salvator Rosa*. He died young about the year 1701, at thirty three years of age, and lies buried in *St. Martin's Church*. He was a person of lively invention, and painted very quick.

COLOUR is defined to be a property inherent in light, whereby, according to the different sizes or magnitudes of its parts, it excites different vibrations in the fibres of the optic nerve, which being propagated to the *sensorium*, affects the mind with different sensations.

Or it is defined to be a sensation of the soul, excited by the application of light to the *retina* of the eye, and different as that light differs in the degree of its refrangibility, and the magnitude of its component parts.

So that in the former view, *light* is the subject of *Colour*, and in the latter it is the agent.

The opinions of authors, both antient and modern, have been various, with respect to the nature and origin of the phenomenon of *Colour*.

The most popular opinion is that of the followers of *Aristotle*, who maintain'd that colour was a quality residing in the *colour'd* body, and that it does exist independently of light.

The *Cartesians* came indeed something nearer to the truth, who owned, that as the *colour'd* body is not immediately apply'd to the organ, to occasion the sensation, and that as no body can affect the sense but by immediate contact; the *colour'd* body does not excite the sensation of it self, or contribute any thing to it, otherwise than by moving some interpos'd medium, and by that the organ of light.

They add, that as we find that bodies don't affect the sense in the dark, light only occasions the sense of *Colour*, by moving the organ; and that *colour'd* bodies are no further concern'd, than as they reflect the light with a certain modification; the differences in their colours arising from a difference in the texture of their parts, whereby they are dispos'd to reflect the light with this or that modification.

But 'tis to the incomparable Sir *Isaac Newton* we owe a solid and consistent theory of *colours*, built on some experiments, and solving all the *phænomena* thereof. His doctrine is as follows.

It

## C O L

It is found by experience, that rays or beams of light are compos'd of particles very heterogeneous, or dissimilar to each other, *i. e.* some of them, as it is highly probable, are larger, and others less.

For a ray of light, as *E F* (See plate fig. VI.) being receiv'd on a refractory surface, as *A D* in a dark place is not wholly refracted to *L*, but split as it were, and diffus'd into several little rays; some of which are refracted to *L*, and others to the other intermediate points between *L* and *G*, *i. e.* those particles of the light, which are the most minute, are of all others the most easily and most considerably diverted; by the action of the refracting surface out of their rectilinear course towards *L*: and the rest, as each exceeds another in magnitude, so is it with more difficulty and less considerably turn'd out of its right line to the points between *L* and *G*. See REFRACTIBILITY.

Now each ray of light, as it differs from another in its degree of refrangibility, so does it differ from it in *Colour*; this is warranted by numerous experiments.

Those particles *v. g.* which are most refracted, are found to constitute a ray of a violet colour, *i. e.* in all probability, the most minute particles of light, thus separately impell'd, excite the shortest vibrations in the *retina*, which are thence propagated by the solid fibres of the optic nerves into the brain, there to excite the sensation of violet colour; as being the most dusky and languid of all *Colours*. See VIOLET.

Again those particles which are the least refracted, constitute a *radius* or ray of a red Colour, *i. e.* the largest particles of light excite the longest vibrations in the *retina*, so as to excite the sensation of a red Colour, the brightest and most vivid of all *Colours*. See RED.

The other particles being in like manner separated according to their respective magnitudes into little rays, excite the intermediate vibrations; and thus occasion the sensation of the intermediate colours, much in the same manner as the several vibrations of the air according to their respective magnitudes, excite the sensation of different sounds.

To this it may be added, that not only the more distinct and notable *Colours* of red, yellow, blue, &c. have thus their rise from the different magnitudes and refrangibility of the rays; but also the intermediate degrees or tints of the same colour, as of yellow up to green, of red down to yellow, &c.

Further, the *Colours* of these little rays not being any adventitious modifications thereof, but connate, primitive and necessary properties, as consisting in all probability, in the magnitudes of their parts, must be perpetual and immutable, *i. e.* cannot be changed by any future refraction or reflection, or by any modification whatsoever.

This

## C O L

This is confirm'd by abundance of experiments; all endeavours having been used, after separating a *colour'd* ray from those of other kinds, to change it into some other *Colour* by repeated refractions, but to no effect.

Apparent transmutations of *Colours* indeed may be effected, viz. where there is an assemblage or mixture of rays of different kinds, the component colours never appearing in their natural hue in such mixtures; but always allay'd and temper'd with each other; whence results a middling kind of colour, which by refraction may be separated into component ones; and those after separation being remix'd, return to their former *Colour*.

Hence the transmutations of *Colours*, by mixing those of different kinds, are not real; but mere appearances and deceptions of the sight: for the rays being again severed, exhibit the same colours as at first. Thus blue and yellow powders well mixt, appear to the naked eye green; yet without having pass'd any alteration, when view'd through a microscope, the blue and yellow particles still appear distinct.

Hence there arise two kinds of colours, the one *original* and *simple*, produc'd by homogeneous light, or by rays that have the same degree of refrangibility, and the same magnitude of their parts; such as *red, yellow, green, blue, a violet, purple, orange, and indigo*, with all their intermediate tints and gradations.

The other kind of *Colours* is *secondary* or *heterogeneous*, compounded of the primary ones; or of a mixture of rays differently refrangible, &c.

There may also be secondary colours, produc'd by composition like the primary ones, or those consisting of homogeneous light, as to the species or appearance of the *Colour*; but not as to the permanency or immutability thereof. Thus *yellow* and *blue* make *green*; *red* and *yellow*, *orange*; *orange* and *yellowish green, yellow*; and in the general, if any two *Colours* be mix'd, which in the series of those generated by the prism, are not too far apart from their mixture, results that *colour*, which in the said series is found in the mid way between them; but those situated at too great a distance, do not so.

Indeed, the more any *Colour* is compounded, the less perfect and vivid it is; by too much composition, they may be diluted and weakened, till they cease.

By composition, there may be produced *Colours*, not unlike any of those of the homogeneous light.

The most extraordinary composition is that of whiteness, for to this, all the primary colours abovementioned are required; and those to be mixt in a certain degree.

Hence



# C O L

Hence it is that white is the ordinary *colour* of light ; light being nothing else but a confus'd assemblage of rays of all *Colours*.

If the rays of different *Colours* do thus begin to be separated by one refraction of one single surface, that separation is much promoted, so as even to become sensible to the eye by a double refraction.

This is observ'd in the two surfaces of any glass ; provided those surfaces, be not parallel, but of all others, it is most sensible in the two faces of a triangular prism ; the phænomena whereof, as they are the touchstone of all theories of *Colours*, and as they contain the theory of that is here delivered, we shall lay down as follows.

1. The rays of the sun, transmitted through a triangular prism, exhibit an image of various *Colours* (the chief of which are *red*, *yellow*, *green*, *blue* and *violet*) on the opposite wall.

The reason is, that the differently colour'd rays are separated by refraction ; for the blue rays v. g. mark'd with the dotted line (See plate fig. VII.) which begin to be separated from the rest, by the first refraction in  $dd$  of the side  $ca$  of the prism  $abc$  (as also in the first surface of the globe of water  $abc$ , fig. VIII.) are still further separated in the other side of the prism  $bc$ , (as also in their egress out of the globe  $abc$ ) by a second refraction in  $ce$ , in the same direction as the former : whereas on the contrary, in the plane glass  $ebcf$ , fig. X. (as also in the prism  $glo$ , fig. IX. now plac'd in another situation) those blue rays which begin to be separated from the rest in the first surface in  $dd$  by a second refraction, the contrary way pass out parallel, i. e. remix'd with all the *colours* of the other rays.

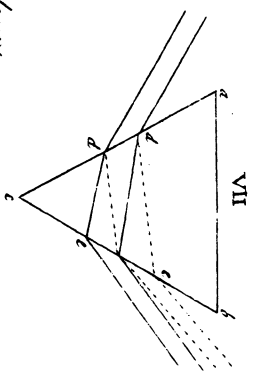
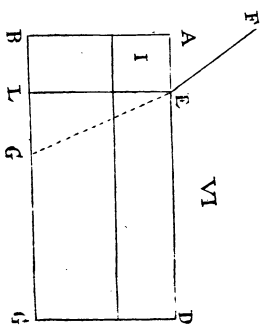
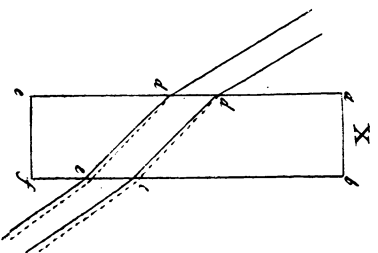
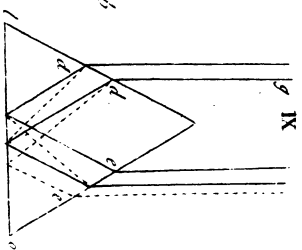
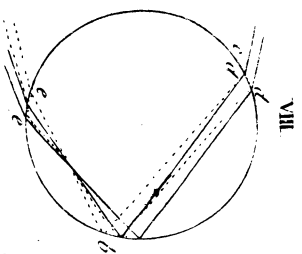
2. That image is not round, but oblong ; its length, when the prism is an angle of sixty or sixty five degrees, being five times its breadth.

The reason is, that some of the rays are refracted more than others ; and by that means exhibit several images of the sun extended lengthwise, instead of one.

3. Those rays which exhibit yellow, are turn'd further from the rectilinear course, than those which exhibit *red*, those which exhibit *green*, than those which exhibit *yellow* ; but of all others, those which exhibit *violet* the most.

Accordingly, if the prism, thro' which the light is transmitted, be turn'd about its axis, so as the *red*, *yellow*, *green*, &c. rays be projected in order, thro' a narrow aperture into another prism, plac'd at the distance of about twelve feet ; the *yellow*, *green*, &c. rays, though falling through the same aperture in the same manner, and on the same point of the second prism, will not be refracted to the same place as the *red* ; but to a point at some distance from it, on that side to which the rotation is made.

Sheet K. Vol. I. to face the VII<sup>th</sup> leaf.

*idours.*



## C O L

This is what Sir *Isaac Newton* calls the *experimentum crucis*; being that which led him out of the difficulties into which the first phænomenon, &c. had thrown him, and plainly shew'd a different degree of refrangibility, and a different *Colour* corresponding thereto in the rays of light; and that yellow rays, v. g. are more refracted than *red* ones, *green* ones more than *yellow* ones, and *blue* and *violet* ones most of all.

4. The *Colour* of *colour'd* rays well separated by the prism, are not at all chang'd or destroy'd by passing an illuminated medium, nor by their mutual decussation, their bordering on a deep shadow; nor their being reflected from any natural body, or refracted through any one, in a place howsoever obscure.

The reason is, that *Colours* are not modifications arising from refraction or reflection, but immutable properties; and such as belong to the nature of the rays.

5. An assemblage of all the kinds of *colour'd* rays, collected either by several prisms, by a convex lens or a concave mirror, or in any other manner, from what we call whiteness; yet each of these after decussation, becoming separated again, exhibits its proper *Colour*: for as the ray was white before its parts were separated by refraction; so the parts being re-mix'd, it becomes white again, and *colour'd* rays when they meet together, don't destroy one another, but are only interspers'd.

Hence a *red, green, yellow, blue* and *violet Colour*, being mixt in a certain proportion appear *whitish*, i. e. are of such a *Colour* as arises from white and black mix'd together; and if there were not some rays absorb'd and lost, would be plainly white.

In like manner, if a paper cut into a circle, be stain'd with each of those *Colours* separately, and in a certain proportion; then swiftly turn'd round its centre, so that the species of *Colours* be mixt together in the eye, by the briskness of the motion, the several *Colours* will disappear, and the whole paper appear of one continued *Colour*; which will be a mean between *white* and *black*.

6. If the rays of the sun fall very obliquely on the inner surface of a prism, those that are reflected will be of a *violet Colour*; those that are transmitted *red*.

For the rays were *colour'd* before any separations, and by how much they are the more refrangible, by so much they are the more easily reflected; and by that means are separated.

7. If two hollow prisms, the one being fill'd with a *blue* fluid, and the other with a *red* one be joined together; they will be opaque, though each being apart will be transparent.

For the one transmitting none but blue rays, and the other none but red ones, the two together will transmit none at all.

8. All natural bodies, especially white ones, view'd through a prism held to the eye, appear fimbriated or bordered on one side with *red* and *yellow*; and on the other with *blue* and *violet*.

For those *fimbria* are the extremes of intire images which the rays of any kind, as they are more or less refracted, would exhibit nearer or at a greater distance, from the real place of the object.

9. If two prisms be so plac'd, as that the *red* of the one, and the purple of the other meet together in a paper fit for the purpose, incompass'd with darkness; the image will appear pale, and if view'd through a third prism, held to the eye at a proper distance, it will appear double, the one red, and the other purple.

In like manner if two powders, the one perfectly *red*, and the other blue, *red* and *purple* be mix'd; any little body cover'd pretty deeply with this mixture, and view'd through a prism held to the eye, will exhibit a double image, the one *red* and the other *blue*; by reason that the *red* and *purple*, or *blue* rays are separated by their unequal refraction.

10. If the rays transmitted through a *convex lens* be receiv'd on a paper, before they meet in a *focus*; the confines or boundary of light and shadow will appear ting'd with a *red Colour*; but if they be receiv'd beyond the *focus*, with a *blue* one.

Because in the first case, the red rays being something more refracted, are the higher; but in the second after decussation in the *focus*, the blue ones.

Lastly, if the rays about to pass through either side of the *pupilla*, be intercepted by the interposition of any opaque body near the eye; the extremes of bodies plac'd, as if view'd through a prism, will appear ting'd with *Colours*, though those not very vivid.

For then the rays transmitted through the rest of the *pupilla*, will be separated by refraction into *Colours*, without being diluted with the admixture of the intercepted rays, which would be refracted in a different manner.

And hence it is, that a body, view'd through a paper, pierc'd with two holes, appears double and also ting'd with *Colours*.

*Of the COLOURS of thin plates.* As rays of different *Colours* are separated by the *refraction* of *prisms*, and other thick bodies; so are they separated, though in a different manner in the thin *lamellæ* or plates of any pellucid matter, v. g. the bubbles rais'd in water thickned by soap, &c.

For all *lamellæ* under a determinate thickness, transmit rays of all *Colours*, without reflecting any at all, but as they increase in thickness, in arithmetical proportion, they begin to reflect first *blue* rays; then in order *green*, *yellow* and *red*, more and more  
mixt

# C O L

mixt and diluted, till at length, arriving at a certain thickness, they reflect rays of all *Colours*, perfectly intermixt with white.

But in whatsoever part a slender *lamellæ* reflects any one colour, v. g. *blue*, in that part it always transmits the opposite colours, v. g. *red* or *yellow*.

It is found by experiment, that the difference of *Colour* of a plate, does not depend upon the medium that encompasses it, but the degree of vividness does; *cæteris paribus*, the *Colour* will be more vivid, if the denser medium be encompass'd with a rarer.

A plate, *cæteris paribus*, reflects more light, as it is thinner, as far as a certain degree of thinness; beyond which, it reflects no light at all.

In plates, the thickness of which increase in an arithmetical progression of the natural numbers, 1, 2, 3, 4, 5, &c. If the first or thinnest reflect any homogeneous ray, the second will transmit it, and thus is the same ray alternately reflected and transmitted, *i. e.* the plates corresponding to the odd numbers, 1, 3, 5, 7, &c. will reflect the same rays, that those corresponding to the even ones, 2, 4, 6, 8, &c. transmit.

Hence an homogeneous *Colour* in a plate is said to be of the *first order*; if the plate reflect all the rays of that *Colour*. In a plate, whose thinness is in a threefold proportion to the first, it is said to be of the *second order*, in another, whose thinness is five times that of the first, it is said to be of the *third order*, &c.

A *Colour* of the first order, is the most vivid of any, and successively the vividness of the *Colour* increases, as the quantity of the order increases; the more the thickness of the plate is increased, the more *Colours* it reflects; and those of more different orders.

In some plates the *Colour* will vary as the position of the eye varies, in others it is permanent.

**COLOURS of natural bodies.** Bodies only appear of different *Colours*, as their surfaces are dispos'd to reflect rays of this or that *Colour* alone, or of this or that *Colour* more abundantly than any other; hence bodies appear of that *Colour* which arises from the mixture of the reflected rays.

All natural bodies consist of very thin, transparent *lamellæ*; which if they be so dispos'd in regard to each other, as that there happen no reflections or refractions in their interstices, those bodies become pellucid or transparent, but if their intervals be so large, and those are fill'd with such matter; or so empty (in respect to the density of the parts themselves) as that there happen a number of reflections and refractions within the body, the body in that case becomes opaque.

## C O L

The rays which are not reflected from an opake body penetrate into it, and there suffering innumerable reflections and refractions at length unite themselves, to the particles of the body itself.

Hence an opake body grows hot the sooner, as it reflects light less copiously; whence we understand the reason why a white body, which reflects almost all the rays that strike upon it, heats much more slowly than a black one, which reflects scarce any.

In order to determine that constitution of the surface of bodies, wherein their *Colour* depends; it must be observ'd, that the smallest corpuscles or first particles of which surfaces are made up, are most thin and transparent, and separated by a medium of a different density from the particles themselves.

So that in the surface of every *colour'd* body are innumerable smaller, thin plates, corresponding to those of bubbles; wherefore, what has been observ'd of those may be understood of these.

Hence it is gathered, that the *Colour* of a body depends upon the density and thickness of the parts of the body, between the pores of the surface, that the colour is more vivid and homogeneous, as the parts are thinner; that *cæteris paribus* the said parts are the thickest when the body is red, and the thinnest when *violet*; that the parts of bodies are usually much denser, than the medium contain'd in their interstices; but that in the tails of peacocks, some silks, and generally, in all bodies whose *Colour* varies, according to the situation of the eye, it is less; and that the *Colour* of a body is the less vivid to the eye, as it has a denser medium within its pores.

Now of the several opake bodies, those consisting of the thinnest *lamellæ* are *black*, those consisting either of the thickest *lamellæ*, or of *lamellæ* very different from each other in thickness, and on that account fitted to reflect all *Colours*, as the froth of water, &c. are white.

Those again consisting of *lamellæ*, most of which are of some intermediate thickness, are *blue*, *green*, *yellow* or *red*, inasmuch as they reflect the rays of that particular *Colour*, much more copiously than that of any other *Colour*; most of which last they either absorb or extinguish, by intercepting them, or else they transmit light.

Hence it is, that some liquors, v. g. an infusion of *lignum nephriticum* appear *red* or *yellow*, if view'd by reflected light, and *blue* by transmitted light; and leaves of gold *yellow* if view'd by reflected light, but *green* or *blue* in the latter.

To this we may add, that some of those powders, us'd by painters, have their *Colour* chang'd by being very finely ground; which must be caus'd by the commination, or breaking of  
their



## C O L

their small parts into others still smaller, just as a *lamella* has its *Colour* altered by altering its thickness.

In short, those odd phænomena arising from the mixture of liquors of different *Colours*, can no way be better accounted for, than from the various actions of the saline, &c. corpuscles of one liquor with the coloured corpuscles of another; if they unite, the mass will either swell or shrink, and thereby its density will be altered; if they ferment, the size of the particles may be diminished, and thereby the coloured liquor may become transparent; if they coagulate, an opake liquor may be produc'd of two transparent ones.

Hence it is easy to conceive, why a colour'd liquor in a glass of a conical figure, plac'd between the *eye* and the *light*, appears of a different *Colour* in different parts of the vessel; there being more and more rays intercepted, as they pass through a longer or shorter section of the vessel, till at the base they are all intercepted, and none seen but those that are reflected.

From the various *Colours* of natural bodies, Sir *Isaac Newton* observes, the bigness of their component parts may be estimated; for that the parts of bodies do properly exhibit the same *Colour* with a *lamella* of equal thickness provided the density in both be the same.

### *The seven Painting COLOURS in general*

1. The chief *whites* are *spodium*, *cerufs*, *white-lead*, *Spanish white*, *egg-shells* burnt.

The *Spanish white* is thus made:

Take fine *chalk* six ounces, *allum* two ounces, grind them together in fair water, till it be like pap, roll it up into balls which dry leisurely; then put them into the fire till they are red hot, take them out and let them cool.

*This is the best white of all to garnish with, being ground with weak gum water.*

2. The chief *blacks* are these; *harts-horn* burnt, *ivory* burnt, *lamp-black*, *charcoal*, *sea-coal*, *verditer* burnt, *mummy* burnt.

3. The chief *reds* are these; *carmine*, *vermilion*, *red-lead*, *Indian lake*, *native cinnabar*, *red-oaker*, *yellow-oaker* burnt, *Indian-red*.

4. The chief *greens* are these; *green bice*, *green pink*, *verdegrease*, *verditer*, *sap-green*, *pink*, mixt with *bice*.

5. The chief *yellows* are these; *orpiment*, *masticote* deep and light, *saffron*, *pink yellow*, dark and light, *oker de luce*, *English-oaker*, *Roman-oaker*, *gall-stone*.

6. The chief *blues* are these; *ultramarine*, *indigo*, *smalt*, *blue-bice*.

7. The chief *browns* are these; *umber*, *Spanish-brown*, *Coten's earth*, *gall-stone*, *rust of iron*, *mummy*.

## C O L

This is to be noted, that of the *Colours* before named, *vermilion*, *verdegrease*, *orpiment*, and some others are too coarse and gritty to be us'd in water colours, unless they be purified and prepar'd.

And *turnsole*, *litmose blue*, *roset*, *brasil*, *logwood* and *saffron* are more fit for washing prints, than curious limning.

COLOURS in painting is a term apply'd both to the drugs, and the tints produc'd by those drugs, variously mixt and apply'd.

The principal *Colours* us'd by painters are *red* and *white-lead* or *cerufs*, *yellow* and *red oakers*; several kinds of earth, as *umber*, *orpiment*, *lamp-black*, *burnt Ivory*, *black lead*, *cinnabar* or *vermilion*, *gamboge*, *lacca*, *blue* and *green ashes*, *verdegrease*, *bistre*, *bice*, *smalt*, *carmine*, *ultramarine*; each of which with the manner of preparing them, their uses, &c, are to be found under their proper articles.

Of these colours some are us'd tempered with gum water, some ground with oil; others only in *fresco*, and others for miniature; all which see under their proper heads.

Painters reduce all the *Colours* they use under these two classes, of *dark* and *light* COLOURS.

*Dark Colours* are black, and all others that are obscure and earthy, as *umber*, *bistre*, &c.

Under *light Colours* are comprehended *white*, and all those that approach nearest it.

Painters also distinguish COLOURS into *simple* and *mineral*.

Under *simple Colours* they rank all those which are extracted from vegetables, and which will not bear the fire, as the *yellow*, made of *saffron*, *French bernies*, *lacca*, and other tinctures extracted from flowers, us'd by limners, illuminers, &c.

The *mineral Colours* are those which are drawn from metals, &c. and that are able to bear the fire: us'd by enamellers.

*Changeable and permanent* COLOURS, is another division, which, by some, is made of *Colours*.

*Changeable Colours* are such as depend on the situation of the objects with respect to the eye, as that of a pigeon's neck, *taffeta's*, &c. the first however, being attentively view'd with a microscope, each fibre of the feathers appears compos'd of several little squares, alternately *red* and *green*; so that they are fix'd *Colours*.

*Kircher* says, that the changing, *i. e.* changeable *Colour* observ'd in the wings of pigeons, peacocks, &c. arises from the feathers being transparent, and of a figure resembling a prism; and consequently the lights being differently refracted from them, and

*Permanent Colours* are not exhibited by refraction, but by reflection.

M. Mariotte

# C O L

M. Mariotte observes, that there are two different gradations or series of *Colours* from *white* to *black*; the one *white*, *yellow*, *red* and *black*, and the other *white*, *blue*, *violet*, and *black*.

## COLOURS *in particular.*

**CERUSS**, grind it with glair of eggs, and it will make a very good white. It is too *yellow* for some purposes, coarse and gritty.

**WHITE-LEAD**, grind it with a weak water of gum lake, and let it stand three or four days, and if it be afterwards mixt with *roset* and *vermilion*, it will make a fine carnation.

To order *white-lead* so, that it shall neither rust nor shine, both which are of an ill effect in the art of limning. See the article **LEAD**.

*Spanish White*, being ground with gum water, is the best *White* of all to garnish with.

*Lamp-Black*, makes a good *Black* being ground with gum water.

*Vermilion*. If it be ground with the glair of an egg, and a little clarified honey, to make it bright and perfect is good; but native *cinnabar* is better and of a more lively *Colour*.

*Cinnabar Lake* makes a deep and beautiful red, or rather purple, almost like to a red rose, grind it with *gum lake* and *turnsole water*; if you will have it light, add a little *cerufs*, and it will make it a bright *crimson*; if it be to *diaper*, add only *turnsole water*.

*Red-lead*, grind it with some *saffron* and a stiff *gum-lake*; the *saffron* will make it orient and of a marygold *Colour*.

*Turnsole*, lay it in a saucer of vinegar, and set it over a chafing dish of coals; when it boils, take it off, and wring it into a shell, adding a little *gum arabick*, let it stand till it is dissolv'd; this is good for shadowing carnation and all *yellow*s.

*Roset*, grind it with *brasile water*, and it will make a deep purple; put *cerufs* to it and it will be lighter; grind it with *limose*, and it will make a fair *violet*.

*Spanish Brown*, grind it with *brasile water*, mingle it with *cerufs*, and it will make a horse flesh *Colour*. It is not so brisk and lively as *Indian red*.

*Bole Armoniack* makes but a faint *Colour*, the chief use of it is in making size for burnish'd gold.

*Green Bice* is to be ordered as you do *blue Bice*; when it is moist and not thorough dry, you may diaper upon it with the water of deep *green*.

*Verdigrease*, grind it with juice of *rue* and a little weak gum water, and you will have a most pure *green*; if you would diaper with it grind it with lye of *rue* (or the decoction thereof) and it will make a hoary *green*.

# C O L

Diaper upon *Verdegrease* green with sap green ; also *Verdegrease* ground with white *tartar*, and then temper'd with gum water, gives a most perfect green.

*Verditer*, grind it with a weak *gum arabick* water, it is the faintest green that is ; but is good to lay upon *black* in any kind of drapery.

*Sap Green*, lay it in sharp vinegar all night, put into it a little *alum* to raise its *Colour*, and you will have a good green to diaper upon other greens.

It is a shining but a fading *Colour*. You may use green pink instead of it, for that has neither of those faults.

*Orpiment*,  
*Arsenicum*,  
*Auripigmentum*, } grind it with a stiff water of *gum lake*, because it is the best *Colour* itself, it will lie upon no green ; for all greens, white and red-lead, and *cerufs* stain it.

Wherefore, you must deepen your *Colours* so, that the *Orpiment* may be highest, and so it may agree with all *Colours*. It is of a venomous quality, and some of it is coarse.

*Masticote*, grind it with a small quantity of *saffron* in gum water, and never make it lighter than it is, it will endure to lie upon all *Colours* and metals.

*Saffron*, steep it in glair, it may be ground with *vermilion*.

*Pink Yellow*, if you would have it sad colour'd, grind it with *saffron*, if light with *cerufs* ; mix it with gum water, and so use it.

*Oker de Luce*, grind it with pure *brasile* water, and it will make a passing hair *Colour*, and is a natural shadow for gold. *Roman oker* is the most glowing *oker* of all *okers*.

*Umber* is a more sad brown *Colour*, grind it with gum water or gum lake, and lighten it (if you please) with a little *cerufs* and a blade of *saffron* ; to cleanse it, burn it in a crucible, then grind it and it will be good, and when you temper it in the shell use a drop or two of onion water, and it will preserve it from cracking.

*Ultramarine*, if you would have it deep, grind it with *limese* water, but if light with fine *cerufs* and a little gum arabick water.

In grinding *Ultramarine* and other *Colours*, be not too swift in your motion, but let it be gentle and slow, because the swiftness of the motion causes the stones to heat ; which will cause your *Colour* to starve or lose somewhat of its lustre, especially, if it be a *Colour* of no great body, as *pink*, *indigo*, &c.

*Indigo*, grind it with water of *gum arabick*, as you do *ultramarine*.

*Blue Bice*, grind it with clean water, as fine as can be, and then put it into a shell, and wash it, as follows ; put as much wa-

## C O L

ter to it, as will fill up the shell or vessel you put it into, and stir it well; let it stand for an hour, then throw away the filth and dirty water, and put in more clean water, do thus four or five times.

Then put some *gum arabick* water to it somewhat weak, that the *Bice* may fall to the bottom, pour off the gum water, and put more to it, wash it again, dry it and mix it with weak gum water (if you would have it rise of the same *Colour*) but with a stiff water of *gum lake*, if you would have a most *perfect blue*; but grind it with a little *cerufs*, if you would have it a *light blue*, but add *litmose* water, if you would have it a very *deep blue*.

*Smalt*, grind it with a little fine *rosetta*, and it will make a *deep violet*, and by putting in a quantity of *cerufs*, it will make a *light violet*.

*Litmose Blue*, grind it with *cerufs*, with a pretty deal of *litmose*, it will make a *deep blue*, and with a pretty deal of *cerufs*, it will make a *light blue*; grind it with the weak water of *gum arabick*.

Take fine *litmose*, cut it in pieces, lay it in weak water of *gum lake* for twenty four hours, and you will have a water of a most *perfect azure*; with which water you may diaper and damask upon all other *blues*, to make them appear more fair and beautiful.

*Orchal*. Grind it with unslack'd lime and urine, it makes a pure violet; by putting to more or less lime, you make the violet light or deep as you please.

*Mummy burnt* makes a good black; but if not, and is ill-conditioned, hard, and will not flow from the pencil, you may burn it in a crucible well luted.

*English Oker*. It is a yellow colour, and lies even in the shell of it self; it is of great use, being well ground.

*Pink mix'd with Blue Bice*. It is a good green, the fairest pink is best, well ground and temper'd with blue bice, allowing one quantity of *pink* to three of *blue-bice*.

If you would deepen it for landscapes or drapery, mix a little indigo finely ground with it.

*Indian Lake*. This makes a delicate *purple*; grind it with a little gum water, and when it is fine, before you put it into the shell, mix a little powder of white sugar candy with it, which will preserve it from cracking; then you may spread it thinly with your finger about the shell.

*Indian red* makes a very dark red; because this colour is very coarse, you may use *umber* and a little lake tempered, which is as good.

# C O L

*Ivory Black.* Grind it with a little white sugar candy, and it will preserve it from crackling out of your shells; it makes a black.

*Cherry Stone* is burnt in a crucible (as is the former) and so ground. It is good for drapery, and for a black *fattin*; temper it with a little white *indian lake* and *indigo*. Heighten it with a little lighter mixture; deepen it with *ivory black*.

*Caput Mortuum of Vitriol.* First grind it well upon a marble; then wash it well, as is directed for the washing white lead: see *white LEAD* or *WASHING*. Then grind it with a weak gum lake water; it will make a deep red, or almost purple colour.

## *Observation on Mineral COLOURS.*

1. *Sublimate* dissolv'd in fair water, and mix'd with a little spirit of urine, makes a milk white mixture in a moment; which by an addition of *aqua fortis*, becomes transparent again immediately.

2. If you sublime together two ounces of sublimate, and one ounce of tin glafs, you will have a sublimate not inferior to the best *orient pearls* in the world.

3. *Silver* dissolv'd in *aqua fortis*, and evaporated to dryness, and having had water poured two or three times upon it, and evaporated till the calx is dry, leaves it of a snow whiteness; which rubb'd upon the skin (wetted with spittle, water, or the like) produces a blackness not to be got off in some days.

With this may be dyed *ivory*, *hair*, and *horns* in fair water, of a lasting black.

4. *Coral* dissolved by oil of vitriol, sulphur, or spirit of vinegar, and precipitated by oil of *tartar*, yields a snow whiteness.

The same of crude lead and quicksilver dissolv'd in *aqua fortis*. So butter of *antimony* rectified by bare effusion in a good quantity of fair water will (tho' unctuous) be precipitated into that snow white powder, which (being wash'd from its corrosive salts) is call'd *mercurius vitæ*. The like of which may be made without the addition of any *mercury*.

5. *Mercury sublimate* and *precipitate* yield (with the spirit of urine, hartshorn, or the like) a *white precipitate*; but with the solution of pot ashes, or other *lixivate* salts, an orange tawney.

And if on a filtrated solution of vitriol, you put the solution of a *fixed-salt*, there will subside a copious substance far from whiteness, which chymists call the sulphur of vitriol.

6. If two ounces of *copper* be mix'd with one ounce of tin, the reddishness will vanish; and if *arsenick* (calcin'd with nitre) in a just proportion, be mix'd with melted *copper*, it will be blanch'd both within and without.

7. Fine

## C O L

7. Fine powders of *blue bice*, and *yellow orpiment*, slightly mixed, produce a good green; and a high yellow solution of a good gold in *aqua regia*, mix'd with a due quantity of a deep *blue* solution of crude copper in strong spirit of urine, produces a transparent green; and so *blue* and yellow enamel fus'd together in the flame of a lamp, being strongly blow'd on without ceasing, produces at length a green colour.

8. An *urinous salt* put in a large quantity into the dissolution of blue vitriol in fair water, turns the liquor and corpuscles (which resided) into a yellowish colour like yellow oker.

9. *Verdegrease* ground with *sal armoniack*, and the like (digested for a while in an horse dunghill) makes a glorious *blue*.

10. The true glass of *antimony*, extracted with acid spirits, (with or without wine) yields a red tincture.

11. *Balsam of sulphur* (of a deep red in the glass) shak'd about, or dropt on paper, gives a yellow stain.

12. If brimstone and *sal armoniack* powdered, of each five ounces, be mix'd with six ounces of quick lime in powder, and distill'd in a retort in sand by degrees, you will have a volatile spirit of sulphur of excellent redness, though none of the ingredients be so.

So also oil of anniseeds, mix'd with oil of vitriol, gives in a trice a blood red colour, which soon decays.

13. Fine silver dissolv'd in *aqua fortis*, and precipitated with spirit of salt, upon the first decanting the liquor, the remaining matter will be purely white; but lying uncovered, that which is expos'd to the ambient air will lose its whiteness.

14. Sublimate dissolv'd in a quantity of water and filtred, till it is as clear as crystal, mixed (in a *Venice* glass) with good oil of *tartar per deliquium* filtred (three or four drops to a spoonful) will yield an opacous liquor or a deep orange colour; after which, if four or five drops of vitriol be dropt in, and the glass strait-way be strongly shaken, the whole liquor will (to admiration) be colourless without *sediment*.

And if the filtred solution of *sublimed sal armoniac* and sublimate, of each alike, be mixt with the solution of an *alkali*, it will be *white*.

15. Spirit of *sal armoniack* makes the solution of *verdegrease* an excellent *azure*; but it makes the solution of sublimate yield a white precipitate.

16. So the solution of filings of copper in spirit of urine (made by fermentation) produces a lovely azure colour, which with oil of vitriol (a few drops to a spoonful) is in a trice depriv'd of the same, and render'd like fair water.

And so also a solution of *verdegrease* in fair water, mixed with strong spirit of salt or dephlegmated *Aqua fortis*, makes the greenness almost totally disappear.

17. *Quick-*



## C O L

17. *Quicksilver* mixt with three or four times its weight of good *oil of vitriol*, and the oil drawn off in sand, through a glass retort, leaves a snow white precipitate, which by the affusion of fair water, becomes one of the loveliest light *yellows* in the world, and a durable colour.

18. *Tin* calcin'd *per se* by fire, affords a very white *calx*, call'd *putty*; *lead*, a red powder call'd *minium*; *copper*, a dark or greyish powder; *iron*, a dirty yellowish colour, call'd *crocus martis*; and *mercury*, a red powder.

19. *Gold* dissolv'd in *aqua regia*, ennobles the *menstruum* with its own colour; *silver coin* dissolv'd in *aqua fortis*, yields a tincture like that of *copper*; but fine silver, a kind of *bluishness*. *Copper* dissolv'd in spirit of sugar (drawn off in a glass retort) or in oil or spirit of *turpentine*, affords a *green* tincture; but in *aqua fortis*, a *blue*.

20. *Vermilion* is made of *mercury* and *brimstone* sublimated together in a due proportion.

21. You may give glass a noble golden colour with quicksilver; but it is now coloured yellow, generally with *calx* of *silver*; yet shell silver (such as is generally us'd with pen or pencil) mixed with a convenient proportion of powdered glass in three or four hours fusion, gives a lovely *sappharine blue*.

22. Glass is ting'd green (by the glass men) with the *calx* of *Venus*; which *calx*, mixt with a hundred times its weight of fair glass, gives in fusion a *blue* coloured mass.

23. *Putty* (which is tin calcin'd) as it is white of it self, so it turns the purer sort of glass metal into a white mass, which when opacous enough serves for a white *enamel*.

24. The white *enamel* is as it were the basis of all those fine concretes, which goldsmiths and several artificers use in the curious art of enamelling.

For this white and fusible substance will receive into it self, without spoiling them, the colours of divers other mineral substances, which like it will endure the fire.

25. Glass is ting'd blue with the dark mineral call'd *zaffer* or *zaffera*; and with *manganese* or *magneffa*, in a certain proportion, glass may be ting'd of a *red* colour, and also of a *purplish* or *murrey*; and with a greater quantity, into that deep colour which passes for *black*.

26. Yellow *orpiment*, sublim'd with sea salt, yields a white and crystalline *arsenick*; *arsenick* calcin'd with pure nitre, being duly added to *Venus* in the fusion, gives it a whiteness both within and without.

27. So *lapis calaminaris* turns *Venus* or *copper* into *brass*.

28. And

## C O L

28. And *zink* duly mix'd with *Venus*, when it is in fusion, gives it the noblest golden colour, that was ever seen in the best gold ; but it will not endure various meltings.

29. *Copper* dissolv'd in *aqua fortis* will imbue several bodies of the colour of the solution.

30. *Gold* dissolv'd in *aqua regia*, will (tho' not commonly known) dye horn, ivory, and other bones of a durable purple colour.

31. Lastly, crystals of silver, made with *aqua fortis*, (tho' they appear white) will presently dye the skin, nails, hair, and bones, with a *black* not to be washed off.

### *Observations on vegetable COLOURS.*

1. A strong infusion of galls filtred, mixt with a strong and clear solution of *vitriol*, makes a mixture as black as *ink*; which, with a little strong oil of *vitriol*, becomes transparent again. After which, by the affusion of a little quantity of a strong solution of *salt of tartar*, it regains its black colour.

The first black (altho' pale in writing, yet) being dry, appears to be good ink.

2. A decoction of *red roses*, dried in fair water, mixed with a filtrated solution of *blue vitriol*, makes a black colour; and this being mix'd with a little *aqua fortis*, turns it from a black to a deep red; which, by the affusion of a little spirit of urine, may be presently reduced to a thick and black colour.

3. *Yellow wax* is whitened by dissolving it over the fire in spirit of wine; letting it boil a little, and then exhaling the spirit, or else while it is hot, separating it by filtration.

4. Fair water, mixt with a blood red tincture of *benjamin*, drawn with spirit of wine, immediately makes it of a milk white colour.

5. Blackness may be taken away with oil of vitriol; so black pieces of silk or hair may be turn'd to a kind of yellow.

6. A handful of *lignum nephriticum* rasp'd, infus'd in four pound of spring water, yields between the light and the eye an almost golden colour (except the infusion be too strong;) but with the eye, between the light and it (in a clear vial) a lovely blue, as indeed it is. This with spirit of vinegar may be made to vanish (still keeping its golden colour;) and afterwards, with oil of tartar *per deliquium*, may be restored again.

7. Cloth dyed with *blue* and *woad* is dyed into a green by the yellow decoction of *luteola*.

8. Syrup of violets, mixt with a high solution of gold in *aqua regia*, produces a reddish mixture; and with a high solution of filings of copper in spirit of urine, a lovely fair green.

9. Syrup

## C O L

9. *Syrup of violets*, mixt with a little juice of lemons, spirit of salt, vinegar, or the like acid salt, will immediately become red; but mix'd with oil of *tartar*, or a solution of pot ashes, will in a moment become a perfect *green*; and the like in the juice of *blue-bottles*.

10. A good quantity of oil of *tartar*, put into a strong solution of *verdegrease*, gives a delightful *blue*, which may be variously chang'd, by adding spirit of urine or hartshorn.

11. Altho' red roses hung over the fume of sulphur, lose all their redness, and become white; yet oil of sulphur (which is nothing but the fumes condensed) doth wonderfully heighten the tincture of the same.

12. *Cochineal* will have its colour far more heightened by spirit of *urine*, than by rectified spirit of wine; and one grain of *cochineal* in a good spirit of urine, being put into a hundred and twenty six ounces of water, ting'd it (although but faintly) which amounts to above 125000 times its own weight.

13. Twenty grains of *cochineal* being mix'd with an ounce of *saccharum saturni*, will make a most glorious purple colour; and so accordingly, as the quantity is either diminished or increas'd, so the purple colour shall be either lighter or deeper.

14. A few grains of *cochineal* being mixt with the *lixivium* of *quicklime* in a due proportion, makes a fading purple colour of the greatest glory imaginable in the world.

15. The juice of *privet berries* with spirit of salt is turned into a lovely red; but with a strong solution of pot ashes into a delightful green.

16. *Spirit of salt* makes no considerable change; but rather a lighter *red* upon things red by nature, as syrup of *clove gilliflowers*, juice of *buck-thorn berries*, infusion of *red-roses*, *brassile*, &c.

17. Juice of *jasmin* and snow drops, will turn into a deep greenish yellow, by a strong alkaline solution (altho' the juice of *jasmin*, &c. before were of no colour.)

18. *Buckthorn berries*, being gathered green and dried, are call'd *sap-berries*, which being infus'd in alum water, produces a fair yellow (which is us'd by book-binders for the edges of books, and to colour leather also;) being gathered when they are black, they are call'd *sap-green*, and make a green colour, being put into a brass or copper vessel for three or four days; or a little heated upon the fire, and mix'd with alum in powder, and pressed out; so put into bladders, hanging it up till it is dry; and being gathered about the end of *November*, (when they are ready to drop) they yield a purplish colour.

19. Tincture of *cochineal*, diluted never so much with fair water, will never yield a yellow colour. A single drop of a  
deep

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deep solution in spirit of urine, diluted in an ounce of fair water, makes a fair pink, or carnation.

20. Oil or spirit of *turpentine*, digested with pure white sugar of lead, yields in a short time a high red tincture, which chymists call *balsamum saturni*.

21. Spirit of salt dropt into a strong infusion of *cochineal* or juice of black-cherries, makes presently a fair red; but dropt into the infusion of *brasile*, a kind of yellow. So the filtrated tincture of *balaustins*, mixt with good spirits of urine, or the like, turns of a darkish green; but with spirit of salt, a high redness, like rich claret wine; which glorious colour may in a moment be destroyed, and turned into a dirty green, by spirit of urine.

22. A high infusion of *lignum nephriticum*, mix'd with spirit of urine, produces so deep a blue, as to render the liquor *opaque*; which however vanishes, after a day or two, and leaves the liquor of a bright amber colour.

Where you may take notice, that instead of spirit of urine, you may use oil of *tartar*, or a strong solution of pot-ashes.

23. Infusion of *log wood*, in fair water (mixt with spirit of *sal armoniack*) immediately turns into a deep, rich, lovely purple; two or three drops is enough for a spoonful, lest the colour be so deep as to be opaque.

24. Spirit of *sal armoniack* will turn syrup of violets to a lovely green.

25. An infusion of *litmose* in fair water will in a clear glass give a purple colour; but will be wholly chang'd into a glorious yellow, by spirit of salt being added.

26. The infusions and juices of several plants will be much altered by a solution of lead in spirit of vinegar; it will turn the infusion of red rose leaves into a sad green.

27. So the tincture of red roses in fair water would be turn'd into a thick green, with the solution of minium in spirit of vinegar; and then with the addition of oil of vitriol the resolved lead would precipitate white, leaving the liquor of a clear high red colour.

28. It has not been yet found, that to exhibit the strong variety of colours, there is need that any more than these five be applied, *viz. white, black, red, blue, yellow*; for these being variously compounded, exhibit a variety and number of colours; so many, that those who are strangers to painting, can hardly imagine.

29. So *black* and *white* variously mixt, make a vast company of light and deep grays; *blue* and *yellow*, a great variety of greens; *red* and *yellow*, several orange tawneys; *red* and *white*,  
a number

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a number of *earnations*; *red* and *blue*, several *purples*; and thus are many colours produc'd, for which we want names.

30. Acid salts destroy a blue colour; sulphureous, urinous, or fixed, restore it.

31. *Acid* and *alkalizate salts*, with many bodies that abound with sulphureous or oily parts, will produce a red, as is manifest in the tincture of sulphur, made with lixiviums of calcined *tar* or pot ashes.

### Of Preparing COLOURS.

*Colours*, according to their nature, have each a particular way of preparation, viz. by grinding, washing, or steeping.

The chief colours to be ground are these; *white lead*, *ceruss*, *cinnabar*, *lake*, *oker yellow* and *brown*, *pink*, *indigo*, *umber*, *colens earth*, *Spanish brown*, *ivory black*, *cherry stone black*, *lamp-black*, *Indian red*, *Indian lake*.

The chief colours to be wash'd are; *red lead*, *masticote*, *green bice*, *cedar green*, *ultramarine*, *blue bice*, *smalt*, *verditer*.

The chief colours to be steep'd are; *sap-green*, *saffron*, *turnsole*, *stone-blue*, *Venice berries*.

### The method of GRINDING COLOURS.

Take the colour you would grind, and scrape off from it all the filth; then lay it upon the stone, and with the muller, bruise it a little; then put to it a little spring water, and grind all together very well, till the colour is very fine; which done, pour it out in certain hollows or furrows cut in chalk-stone, and there let it lie till it is dry, which preserve in paper or glasses.

Take care in grinding your colours not to put too much water to them upon the stone, for they ought to be ground pretty thick like pulp or pap; and they ought not to be left too moist, but thick and clammy.

If after your colour is dry in the shell, you can rub it off with your fingers, it must be better bound with gum; and if there be too much gum, it will shine, and be apt to crackle off after it is us'd.

### Of mixt and compound COLOURS.

An *ash colour* or *gray* is made by mixing *white* and *lamp-black*, or *white* with *sinaper*; *indigo* and *black* make an *ash-colour*.

To make an *azure* or *blue*. Mix the *azure* with *glue water*, and not with *gum water*.

A *bay colour*. Mingle *vermilion* with a little *Spanish brown* and *black*.

A *bright crimson*. Mix tincture of *brazile* with a little *ceruss* ground with fair water.

To make a *crimson lake*. It is usually made of the *flocks* shorn

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shorn off from crimson cloth, by a lye made of salt-petre, which extracts the colour; which precipitate, edulcorate, and dry in the sun, or in a stove.

*To make a sad crimson.* Mix the aforesaid light crimson with a little *indigo*, ground with fair water.

*To make a flame colour.* It is made of vermilion and orpiment, mixed deep or light at pleasure: or thus; take red *lead*, and mix it with *masticote*, which heighten with white.

*To make a glass grey.* Mingle *cerufs* with a little *azure*.

*To make excellent good greens.* The liver of a lamprey makes an excellent green; and yellow lay'd upon blue will change into green; so likewise the juice of a *blue flower de luce*, mix'd with gum water, will be a perfect and durable green or blue, according as it is us'd.

*To make a light green.* It is made of *pink* or *smalt* with white, to make it whiter, if need require.

*To make a lead colour.* It is made of *white*, mix'd with *indigo*.

*To make a flesh colour.* Mix a little *lake* and red lead with white, a very small quantity of each; you may make it as light or as red as you please, by putting more or less white in it. If you would have a swarthy complexion to distinguish a man's flesh from a woman's, put a little *yellow oker* among your flesh colour; and for your shadow, put a little more *lake*, and a small quantity of *burnt umber*.

*To make a murrey* which is compos'd of *purple* and *white*; it is made thus, take cinnabar lake two ounces, white lead one ounce, and grind them together.

*To make a good murrey.* Temper *roset* with a little rose water, in which a little gum hath been dissolv'd, and it will be good, but not better than the first.

*To make a pure lake.* Take urine ten pounds; boil it in a kettle, and skim it with an iron skimmer, till it comes to eight pounds; to which add *gum lake* half a pound, allum two ounces and a half; boil all till it is well coloured, which you may try by dipping a piece of linen cloth in it; then add sweet alum in powder a sufficient quantity; strain it, and let it stand; strain it again through a dry cloth, till the liquor be clear; that which remains in the cloth or bag is the pure *lake*.

*To make a deep purple.* This is made of *indigo*, *Spanish brown*, and *white*.

*Another purple.* Boil log-wood in vinegar and beer in a glaz'd earthen vessel, adding thereto a little *alum*, till you taste it to be strong on your tongue; when it is sufficiently boil'd, strain out the liquor through a cloth, and keep it in a glass close stopp'd for use.

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*To make a yellow green on purple.* Buck-thorn berries gathered green, and steep'd in alum water, yield a good yellow; but being thorough ripe and black, they yield a good green; and lastly, being gathered when they are ready to drop off, which is about the middle or end of *November*, their juice mixt with alum water, yields a good purple colour.

*To make a pear green.* Take white tartar and verdegrease; temper them with strong white wine vinegar, in which a little gum arabick has been dissolved.

*Another purple Colour.* Mix blue bice and lake together, or if you want bice, take blue verditer (but that is not altogether so good) mix them well together, and it is done. If you want lake, you may instead thereof use thick red ink, which will do as well as lake in washing.

*To make cloud Colours.* You may sometimes take blue verditer, sometimes light masticote shadowed with blue verditer, or lake and white, or red ink and white shadowed with blue verditer.

*To make a Red Colour.* Take the roots of the lesser bugloss, viz. alkanet, and beat them, and strain out the juice, and mix it with alum water.

*To make a Scarlet Colour.* It is made of red-lead, lake and vermilion, yet vermilion in this case is not very useful.

*To make a pure Purple Colour.* Take fine brimstone an ounce and a half, quicksilver, sal armoniac, jupiter, of each one ounce, pulverize the salt and brimstone, and make an amalgama with the quicksilver and tin; mix all together, which put into a great glass gourd; make under it an ordinary fire, and keep it in a constant heat for the space of six hours.

*A Saffron Colour,* is made of Saffron alone by infusion.

*To make Vermilion.* Take brimstone in powder four ounces, mix it with quicksilver a pound, put it into a crucible well luted, and upon a charcoal fire heat it till it is red hot, then take it off and let it cool.

*To make a Violet Colour.* Take a little indigo and tincture of brasile, grind them with a little cerufs.

*To make a Yellow.* Take the Yellow chives in white lilies, steep them in gum water and they will make a perfect Yellow; the same from saffron and tartar tempered with gum water.

**TEMPERING of COLOURS.** Take a little of any Colour, and put it into a clean shell, and add to it a few drops of gum water, and with your finger work it about the shell, and let it dry, and when dry, touch it with your finger; if any Colour comes off, you must add stronger gum water; but being dry, if the Colour glister or shine, it is a sign there is too much gum in it, which you may remedy, by putting in fair water.

*To*



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*To HELP the defects of COLOURS.* Some Colours, as lake, umber and others which are hard, will crack ; when they are dry in this case in tempering them, add a little white sugar candy in very fine powder ; which mix with the Colour and fair water in the shell, till the sugar candy is dissolv'd.

These Colours, umber, Spanish brown, Golden-earth, cherry-stone and ivory-black, are to be burnt before they are ground or wash'd.

*To BURN or CALCINE COLOURS.* This is to be done in a crucible, covering the mouth of it with clay, and setting it in a hot fire, till you are sure it is red hot through ; which done, being cold, wash or grind them as before directed.

*To prepare SHADOWS for COLOURS.* White is shaded with black, and contrary-wise, yellow with umber and the okers, vermillion with lake, blue bice with indigo, black-coal with roset, &c.

## *The several TEMPERATURES for colouring and SHADOWING HISTORY.*

They are twenty in number, viz.

1. Sea-coal mixt with lake.
2. UMBER with masticote.
3. Yellow-oker burnt with white.
4. UMBER with ultramarine.
5. Yellow with umber.
6. UMBER with lake.
7. Verditer burnt with red-lead and white.
8. Ultramarine with lake.
9. Ultramarine with red-lead.
10. Ultramarine with white.
11. Indigo with white.
12. Indigo and lake with white.
13. Indigo and pink with white.
14. Indigo with oker and white.
15. Indigo with masticote and white.
16. Cherry-stone burnt with white and red-lead.
17. Burnt-Ivory with lake.
18. Indigo and pink with the best rust of iron.
19. Lake and rust of iron with light pink.
20. Rust of iron and lake for the deeper Shadows.

## *The several TEMPERATURES or mixtures for SHADOWING HEADS after the life.*

The principal mixtures are twelve in number.

1. Lake with Indian-red.
2. Red-lead with Roman oker.

3. Indian-

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3. *Indian-red with ultramarine.*
4. *Indian-red with pink and gall-stone.*
5. *Yellow-oker with indigo.*
6. *Red-lead with pink and indigo.*
7. *Red-lead with Roman-oker and indigo.*
8. *Red-lead with pink, yellow-oker and lake.*
9. *Indigo, lake and Roman-oker with white.*
10. *Indigo, pink and Roman-oker with Indian-red.*
11. *Red-lead with umber, masticote and pink.*
12. *Pink with Roman-oker.*

**To WASH COLOURS.** Put the *Colour* into a glaz'd vessel, and put fair water to it plentifully, wash it well, and decant (after a while) the water; do this six or seven times; at last put the water (being just troubled) into another glaz'd vessel, leaving the dregs at the bottom; then into this second vessel put more fair water, washing it as before, till the water (being settled) be clear and the *Colour* remain fine at the bottom.

*Before you take the Colour out of the vessel, spread it very thin, about the sides thereof, and when it is dry, some of it will fall to the bottom, which keep by itself; but the remainder which sticks to the sides of the basin is the best of all, which with a feather, strike off from the sides of the vessel, for it will be finer than any flour.*

**STEEPING of COLOURS.** Take a quantity of the *Colour*, and put it into a shell, and fill the shell with fair water, to which add some fine powder of *allum*, to raise the *Colour*; let it thus steep a day and night, and you will have a good *Colour*.

Where note, saffron steep'd in vinegar gives a good *Colour*, and the *Venice* berries in fair water and a little *allum*, or a drop or two of oil of *vitriol* makes a fair yellow.

But some *Colours* are to be boil'd, as *brasile*, *logwood*, *turnsole*, *rinds of walnuts*, *wood foot*, &c. these when boil'd are to be kept close stopp'd in glasses, till you have occasion to use them.

**COLOURS us'd in DYING.** There are in the art of *Dying* five *Colours* call'd *Simple primary* or *mother Colours*, from the mixture of which all the other *Colours* are form'd; these are *blue*, *red*, *yellow*, *brown* and *black*.

Of these *Colours*, variously mix'd and combin'd, they form the following *Colours*, *pansy*, *blue* and *red*; from the mixture of *blue* and *scarlet* are form'd *amaranth*, *violet* and *pansy*; from the same mixture of *blue* and *crimson red* are form'd the *columbine* or *dove Colour*, *purple*, *crimson*, *amaranth*, *pansy* and *crimson violet*.

Here it is to be observ'd, that they give the name of *crimson* to all *Colours* made with *cochineal*.

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Of *blue* and *red madder* is dyed *purple*, *pepper Colour*, *tan Colour* and *dry-rose Colour*.

The same *blue* with *red* half in grain makes *amaranth*, *tan Colour*, and *dry-rose Colour*.

*Blue* and half *red crimson* compose *amaranth*, *tan Colour*, *dry rose*, a *brown pansy* and *fur-brown*.

*Blue* and *yellow* mixt together compose a *yellow-green*, *spring-green*, *grass-green*, *laurel-green*, *brown-green*, *dark-green*; as well as *sea-green*, *parrot-green*, *cabbage-green*, &c. these three last *Colours* are to be less boil'd than the rest.

This is to be noted, that as to *green* there is no ingredient or drug in nature that will dye it; but the stuffs are dyed twice, first in *blue* then in *yellow*.

*Blue* and *brown*. These two *Colours* are never mix'd alone, but with the addition of *red*, either of *madder* or *cochineal*, they form several *Colours*.

*Red* and *Yellow*. All the shades compos'd of these two *Colours*, as *gold-yellow*, *aurora*, *marygold*, *orange*, *nacarat*, *granat-flower*, *flame-colour*, &c. are made with *yellow* and *red* of *madder*; *scarlet* being less proper as well as too dear.

*Red* and *Brown*. Of these two *Colours* are form'd *cinnamon colour*, *chestnut*, *musk*, *bear's hair*, and even *purple* if the *red* be that of *madder*.

*Yellow* and *Brown*. The *Colours* form'd from these two are all the shades of *feuille mort* and *hair Colours*.

But this may be taken notice of, that though it be said, that there are no *Colours* or shades made from such and such mixtures, it is not meant, that none can be made, but that they are more easily form'd from a mixture of other *Colours*.

COLOURING, and { *Drugs*. Thus dyers distinguish their  
Non COLOURING { *drugs*; the first are applicative, and communicate their colours to the matters boil'd in them, or pass'd through them. As *woods*, *scarlet grain*, *cochineal*, *indigo*, *madder*, *turmeric*, &c. the second serve to prepare and dispose the stuffs and other matters, and to extract the colour out of the *Colouring* ingredients; as *allum*, *salt* or *crystal* of *tartar*, *arsenic*, *realgal*, *salt-petre*, *common-salt*, *sal armoniac*, *sal gemmæ*, *agaric*, *spirit of wine*, *bran*, *peas-flour*, *wheat*, *starch*, *lime* and *ashes*.

COLOURING in *Painting*. The manner of applying and conducting the *colours* of a picture; or it is the picture of lights and shadows form'd by the various *colours*, employ'd in *Painting*.

The *Colouring* is one of the principal branches in *Painting*. M. *Felibien* divides the painter's art into three parts, the *design*, the *composition* and the *Colouring*.

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The *Colouring* strikes the most, but among masters it always gives place to the design.

M. *de Piles* observes, that the word *Colouring* in its confin'd sense, is chiefly applicable to a history piece, scarce at all to a landscape. He adds, that the term *Colouring* relates more immediately to the carnations, than any thing else.

The *Colouring* in its general sense, takes in what relates to the nature and union of colours; their agreement or antipathy; how to use them to advantage in light and shadow, so as to shew a relievo in the figures, and a sinking of the ground. What relates to the aerial perspective, *i. e.* the diminution of colours, by means of the interposition of air; the various actions and circumstances of the luminary and the medium; the different lights both of the bodies illuminating, and illuminated; their reflections, shadows, different views, either with respect to the position of the eye or the object. What produces the strength, fierceness, sweetness, &c. in *Paintings* well colour'd is the various manners of *Colouring* both in figures, landscapes, &c.

*The doctrine of COLOURING is compriz'd under the following Rules.*

Colours are considered either in respect of their use or their *œconomy* and *disposition*.

1. *In respect to their use.* They are us'd either in oil or water, those in oil again, are either considered with a view, either to their preparation or application.

In the preparation of oil colours, care must be taken that they be ground fine; that in putting them on the pallet, those which will not dry of themselves be mix'd with drying oil or other ingredients of a drying quality, and that the ting'd colours be mix'd in as small quantities as possible.

For their *application*, it is consider'd either in respect to the kinds of painting in works of various colours, or in those of one single colour.

For the first in the larger pieces, the colours are either laid on full, so as they may be impasted, or incorporated together, which makes them hold the more firmly.

Or else, the more agreeable ones are mixt, which dry too hard and too hastily, with a little *colour*, and the clearest of the oil; but in both cases the colours are to be laid on strong at first, it being easy to weaken those that are to be thrust back, and to heighten the others; the touches to be bold by the conduct of a free and steady pencil, that the work may appear the most finish'd at a proper distance, and the figures animated with life and spirit.

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As to *glaz'd colours*, care is to be taken that the under colour be painted strong, and that it be a body colour and laid smooth.

In finish'd works which are to be view'd near at hand, they proceed, either by applying each *colour* in its place, preserving their purity without fretting or tormenting them, but sweetly softening all their extremities; or by filling up all the great parts with one single *colour*, and laying the other colours which are to form the little things upon it, which is the more expeditious way, but the more apt to decay.

For the second, the kinds of pictures in one *colour* are two, *viz. camieux*, where the degradations of colours of objects afar off, are usually manag'd by lights, as with crayons and *basso rilievo*; which is an imitation of sculpture of whatsoever matter and colour, in both these the colours are wrought dry. See CAMIEUX.

As for *water colours*, they are wrought various ways, *viz. in distemper*, where the colours are prepared in size, which method is us'd on all kinds of matter, in *fresco* or painting on fresh mortar; where the *Colouring* must be quick, that the matter dry not, and with much care and neatness, laying each colour in its place, and intermingling them by parcels.

In *agouache*, where the colours are mixt with gum, and the pencil dragg'd as in paintings and washings.

In *miniature*, for small and delicate works, where the colours are to be very fine and clean, mixt with gums and wrought in dots or points.

But in all the kinds of painting both in *oil* and *distemper*, especially the latter, care must be taken that the design be fix'd, and all the parts mark'd out, before any colours be apply'd.

But the second part of *Colouring*, or the œconomy and dispensing thereof in paintings, regard is had, either first to the quality of the *colours*, to appropriate them according to their value and agreement, or secondly, to their effect in the union and œconomy of the work.

As to the first, it must be observ'd, that *white* represents light, and gives the briskness and heightning; on the contrary, *black* like darkness obscures and effaces the objects; again, *black* sets off the light parts, and by that they serve each other to loosen the objects.

A proper choice is to be made of *colours*, and the too much charg'd manner is to be avoided, both in *carnations*, where *red colours* are not to be affected, as rather resembling the flesh when dead than the skin; and all bright *glowing colours*, the skin, how delicate soever, being of a down-colour.

In the *drapery*, where the painter has his whole stock of *colours* to chuse out of to procure a good effect, and in the land-

scape to dispose of those colours near one another, which mutually assist and raise each other's force and briskness; as *red* and *green*, *yellow* and *blue*.

To manage them so, as that they be accommodated to the effects of the great parts of light and colour, that the strong colours lead to the soft ones, and make them more look'd at; bringing them forwards or keeping them back according to the situation and degree of force requir'd.

As to the *effects* of *colours*, they either have relation to the union or the œconomy; with respect to the first, care must be taken, that they be laid so as to be sweetly united under the briskness of some principal one; that they participate of the prevailing light of the piece, and that they partake of each other by the communication of light, and the help of reflection.

As for the œconomy in managing their degrees, regard is to be had to the *contrast* or opposition intervening in the union of the *colours*; that by a sweet interruption, the briskness which otherwise fades and palls, may be rais'd to the harmony which makes the variety of *colours* agree; supplying and sustaining the weakness of some, by the strength of others, neglecting some places to serve as a basis or repose to the sight, and to enhance those, which are to prevail through the piece.

As to the *degradation*, where the better to proportion the colours that fall behind, some of the same kind are to be preserv'd in their purity, as a standard for those carry'd afar off to be compar'd by, in order to justify the diminution; regard being always had to the quality of the air, which when loaded with vapours, weaken the colours more than when clear.

As to the *situation* of the *colours*, in this, care must be taken, that the purest and the strongest be plac'd before or in the front of the piece, and that the compound ones, which are to appear at a distance, be kept back by their force; the glaz'd colours particularly to be us'd in the first rank.

Lastly, as to the *expression* of the subject, and the nature of the matters or stuffs, whether shining or dull, opake or transparent, polish'd or rough.

COLOURING. Colours, says the ingenious Mr. *Richardson*, are to the eye, what sounds are to the ear, tastes to the palate, or any other objects of our senses, are to those senses; and accordingly, an eye that is delicate takes in proportionable pleasure from beautiful ones, and is as much offended with their contraries.

Good *Colouring* therefore in a picture, is of consequence, not only as it is a truer representation of nature, where every thing is beautiful in its kind, but as administering a good degree of pleasure to the sense.

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*The Colouring of a picture must be varied according to the subject, the time and place.*

If the subject be grave, melancholy or terrible, the general teint of the *Colouring* must incline to *brown, black or red* and gloomy; but you must be gay and pleasant in subjects of joy and triumph. See **EXPRESSION**.

Morning, noon, evening, night, sun-shine, wet or cloudy weather, influences the colours of things, and if the scene of the picture be a room, open air, partly open and partly inclos'd, the *Colouring* must be accordingly.

The distance also alters the *Colouring*, because of the medium of air, through which every thing is seen, which being blue, the more remote any object is, the more it must partake of that colour, and of consequence must have less force or strength; the ground therefore, or whatsoever is behind a figure (for example) must not be so strong, as that figure is, nor any of its parts which round off, as those that come nearer to the eye; and that not only for the reason already given, but because there will always be reflections stronger or weaker, that will diminish the force of the shadows, which reflections (by the way) must partake of the colours of those things from whence they are produc'd.

Any of the several species of colours may be as beautiful in their kinds as the others, but one kind is more so than another, as having more variety, and consisting of colours more pleasing in their own nature; *in which harmony and agreement of one tint with another, the goodness of Colouring consists.*

To shew the beauty of variety, I will instance in a *gelderrose*, which is white, but having many leaves one under another, and lying hollow, so as to be seen through in some places, which occasions several tincts of light and shadow; and together with these some of the leaves having a greenish tint, all together produces that variety, which gives a beauty not to be found in this paper, though it is white, nor in the inside of an egg-shell though whiter, nor any other white object, that has not that variety.

And this is the case, though this flower be seen in a room, in gloomy or wet weather; but let it be expos'd to the open air, when the sky is serene, the blue that those leaves, or parts of leaves that lie open to it will receive, together with the reflections that then will also happen to strike upon it, will give a great addition to its beauty.

But let the sun-beams touch up its leaves, where they can reach with their fine yellowish tint, the other retaining their sky blue, together with the shadows and brisk reflections it will then receive, and then you will see what a perfection of beauty



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it will have ; not only because the colours are more pleasant in themselves, but there is greater variety.

A sky entirely blue would have less beauty than it has, being always varied towards the horizon, and by the sun-beams, whether rising, setting, or in its progress ; but neither has it that beauty, as when more varied with clouds, ting'd with yellow, white, purple, &c.

A piece of silk or cloth, hung or laid flat, has not the beauty, though the colour of it be pleasing, as when flung into folds ; nay, a piece of silk that has little beauty in itself, may be much improv'd only by being pink'd, water'd or quilted ; the reason is, in these cases there arises a variety produc'd by lights, shades and reflections.

There are certain colours less agreeable than others, as a brick wall for example ; yet when the sun strikes upon one part of it, and the sky tinges another part of it, and the shadows and reflections the rest, this variety shall give even that a degree of beauty.

Perfect black and white are disagreeable, for which reason, *a painter should break those extremes of colours, that there may be a warmth and mellowness in his work ; let him (in flesh especially) remember to avoid the chalk, the brick and the charcoal, and think of a pearl and a ripe peach.*

But it is not enough, that the colours in themselves are beautiful singly, and that there is variety, *they must be set by one another, so as to be mutually assistant to each other ;* and this not only in the object painted, but in the ground, and whatsoever comes into the composition, so as that every part, and the whole together may have a pleasing effect to the eye, such a harmony to it as a good piece of musick has to the ear ; but for which no certain rules can be given, no more than for that, except in some few general cases, which are very obvious, and need not therefore be mentioned here.

The best that can be done, is to advise one who would know the beauty of *Colouring*, to observe nature, and how the best colourists have imitated her.

What a lightness, thinness and transparency, what a warmth, cleanness and delicacy, is to be seen in life and good pictures ?

He that would be a good colourist himself, must moreover practise much, and for a considerable time accustom himself to see well colour'd pictures only ; but even this will be in vain, unless he has a good eye, in the sense, as one is said to have a good ear for musick ; he must not only see well, but have a particular delicacy with relation to the beauty of colours, and the infinite variety of tincts.

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The *Venetian*, *Lombard* and *Flemish* schools have excell'd in *Colouring*; the *Florentine* and *Roman* in *design*; the *Bolognese* masters in both; but not to the degree generally as either of the other.

*Correggio*, *Titian*, *Paolo Veronese*, *Rubens* and *Van Dyck* have been admirable colourists; the latter, in his best things, has follow'd nature extremely close.

*Rafaëlle's Colouring*, especially in his shadows, is blackish. This was occasion'd by the use of a sort of printer's black, and which has chang'd its tinct, though it was warm and glowing at first, upon which account he was fond of it, though he was advis'd what would be the consequence.

However, by the vast progress he made in *Colouring*, after he apply'd himself to it, 'tis judg'd he would in this part of painting also have excell'd as in the others.

Here would have been a double prodigy! Since no one man has ever possess'd even *Colouring* and *Designing*, to that or any very considerable degree.

Though the *Cartoons* are some of the last of his works, it must be confess'd the *Colouring* of them is not equal to the drawing; but at the same time, neither can it be deny'd, but that he that painted those could colour well, and would have colour'd better.

It must be considered, they were made for patterns for tapestry, not profess'd pictures, and painted not in oil, but in distemper; if therefore one sees not the warmth and mellowness, and delicacy of *Colouring*, which is to be found in *Correggio*, *Titian* or *Rubens*, it may be in a measure fairly imputed to these causes.

A judicious painter has other considerations relating to the *Colouring*, when he makes patterns for tapestry to be heighten'd with gold and silver, than when he paints a picture, without any such view; nor can a sort of dryness and harshness be avoid-ed in *distemper* upon paper.

Besides, time hath apparently chang'd some of the colours.

In a word, the *tout ensemble* of the colours is agreeable and noble, and the parts of it are in general extremely, though not superlatively good.

I will only add one observation here concerning the colours of the *draperies* of the Apostles, which are always the same in all the *Cartoons*; only *St. Peter*, when he is a fisherman, has not his large apostolical drapery on.

This Apostle when dress'd wears a yellow drapery over his blue coat, *St. John* a red one over a green, so does *St. Paul*, which is also the same which he wears in the famous *St. Cecilia*, which was painted near ten years before.

*The various forms and degrees of COLOURING.*

There are four various forms or degrees of *Colouring*, viz.

1. Of infants or children.
2. Of virgins or fair women.
3. Naked bodies.
4. Old or aged bodies.

1. *Infants or young children* are to be painted of a soft and delicate complexion, the skin and ears of a ruddy and pleasant colour, almost transparent.

This may be done with *white-lead*, *lake*, and a little *red-lead*, shadowing it thin, faint and soft, letting the *cheeks*, *lips*, *chin*, *fingers*, *knees* and *toes* be more ruddy than the other parts; making all their linen very fine, thin and transparent or perspicuous, with strong touches in the thickest folds.

2. *Virgins and fair women* are as curiously to be express'd as the former, but their muscles ought to appear more plainly; their shapes more perfect, and their shadows to be of a whitish yellow, bluish, and in some places almost purple.

But the most perfect and exquisite direction, is the life, which ought rather to be followed, than any thing delivered by rule.

For the shadows here, mix white with *pink*, and *indigo* and *white*, and in some places *lake* with a little *indigo* and *white*.

As for womens bodies, viz. such as are naked, they are to be represented soft, round, plump, gentle and tender, and without muscles.

*On the contrary the bodies of men are to be represented strong, sturdy, stout and vigorous, with the muscles exactly plac'd and strong; which to do with judgment and understanding, requires time, study and knowledge in anatomy.*

3. Naked bodies are to be painted strong, lively and accurate, exactly matching the respective pairs of muscles and nerves, fixing each artery in its due and proper place, giving each limb its proper motion, form and situation, with its true and natural colour; all which to do well, may be the study and practice of almost ones whole life.

4. *Old or aged bodies* ought to be eminent for exact and curious shadows, which may be made of *pink*, *lake*, and *ivory black*, which make very proper shadows in appearance, like the wrinkles and furrows of the face and hands in extreme old age.

Let the eyes be dark, the aspect melancholy, and hair white (or else the pate bald) and all the remarks of antiquity or age be very apparent.

*Pink* mixt with *lake* and *red-lead* make an excellent shadow for the bodies of *old men*; but for the extremest or deepest shadowings, either in face or body, mix *lake* and *ivory black*, which will

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will make an excellent deep shadow, and will be very useful in expressing the several furrows and wrinkles in the face and hands of very old people, with their dark eyes and melancholy aspects.

But notwithstanding all the foregoing rules, the posture or form of standing, and being, either of the whole body or any of its parts, ought to be diligently observ'd, that the life may be imitated.

### *The making original COLOURS.*

*To make white Lead.* Put into an earthen pot or crucible several plates of fine *Lead*, cover them with white wine vinegar, covering the top of the pot close with clay; then bury it in a cellar for seven or eight weeks, and you will have a good white lead upon the plates, which wipe off.

*To make Verdegrease.* Hang plates of copper over the fumes of *aqua fortis* or spirit of nitre, or dip them in the same or in vinegar.

*To make an Emerald Colour.* Powder *verdegrease* very fine, temper it with varnish, and lay it upon a ground of liquid silver burnisht, and it will look like a fair *Emerald*.

*To make a Ruby Colour.* Mix varnish with *Florence lake*, and it will make a very fair colour.

*To make a Sapphire Colour.* Mix *verdegrease* and *ultramarine* with varnish, and it will make a glorious *Sapphire*.

*To make a Crimson Velvet.* Mix *turnsole* with *Indian lake* (well ground with gum and sugar candy) lay it on full, and when it is wet, wipe away the colour with a dry pencil, where you would have the heightening of the *Crimson Velvet* appear, and the stronger reflection will be well express'd.

*To make a Silver black.* Take fine *Silver* filings of plates, and dissolve them in spirit of *nitre* or *aqua fortis*, and evaporate to driness, or precipitate *cum oleo sulphuris* or salt water, and you will have a snow white precipitate, which mixt with water makes the best black in the world, for dying all manner of hair, bones, horns, woods, metals, &c.

*To make a Murrey or Amethyst.* This is made by grinding *Indian lake* with gum arabick water only.

*To make Red or Ruby for limning.* This also is made of *Indian lake* (which breaks of a scarlet colour) ground with gum water and sugar candy.

*To make azure Blue or Sapphire.* You may make this of *ultramarine* of *Venice* (which is the best) the best *blue smalt*, or *blue bice* ground with gum water only; also good shadowing blues may be made of *indigo*, *flory* and *litmose*, all which need no washing, nor *litmose* no grinding, but only to be infus'd in a *lixivium* of soap-ashes.

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*To make a Green or Emerald.* Make it of cedar green instead of which take green bice to draw with; pink is good also for landscapes, mix'd with bice ashes, as also with masticote and cerufs.

*To make a Yellow or Topaz.* Take masticote, of which there are divers sorts, viz. deeper and paler. Also yellow oker may do for want of better, shadow masticote with yellow oker, deepen it with oker de luce.

*To make ultramarine.* Take lapis lazuli of the deepest colour (having few veins of gold upon it) put it into a crucible, cover it close, heat it red hot, then quench it in urine, vinegar or water, in an earthen pot with a lid; dry it well, then nip off the hard, gray and whitest part from it, with a pair of pincers; then grind the remainder with honey'd water, as fine as may be, and dry it for use.

The honey'd water is made by boiling two spoonfuls of honey in a quart of water.

## *The use and nature of dry COLOURS.*

1. Blue bice is the most excellent blue next to *ultramarine*, which is too good to wash withal, and therefore I leave it out here, and put in blue bice, which will very well serve instead of it; and indeed, you may leave out both, and use smalt instead of them, but that it will not work as well as bice. Bice is too good to use upon all occasions, but when you intend to bestow some cost and pains upon a piece; otherwise you may use no other blue in your work than blue verditer, with which you may make a very good shift, without any other blue, I mean in any ordinary work.

2. Indigo is a dark blue which is used principally to shadow with upon your other blue; indigo and yellow berries mixt together make a dark green to shadow other greens in the darkest places.

3. Blue verditer is a very bright pleasant blue, and the easiest to work with in water; it is somewhat inclining to a green, and being mix'd with yellow berries it makes a good green; this is most used.

4. Verdegrease is a good green, but subject to decay; when it is dry upon the paper, it will be of a lighter colour than it was when you lay'd it first on; therefore, to preserve it from that fault, put some sap-green amongst it to dissolve in it, and it will make it keep its colour. There is distill'd verdegrease to be bought at the colour-shops, that is a far better green than the other, but it is somewhat dearer, and the other will serve instead of it.

5. Verditer

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5. *Verditer-green* is a light green, feldom used in any thing but in colouring landscapes, and those places that should shew afar off; and it is good for such a purpose, because it is somewhat inclining to a blue; but you may make shift to do any thing well enough without it; for a little blue *verditer*, mixed with *copper green* and a little *white*, make just such another green.

6. *Sap Green* is a dark, dirty green, and never used but to shadow other greens in the darkest places, or else to lay upon some dark ground behind a picture which requires to be coloured with a dark green; but you may make shift well enough without this green, for *indigo* and *yellow-berries* make just such another colour.

7. *Copper Green* is an excellent transparent green, of a shining nature, if it be thickened in the sun, or upon a gentle fire; and it is most used of any green in washing, especially in colouring of the grass, ground, or trees, for it is a most perfect grass green.

8. *Vermilion* is the perfectest scarlet colour; you need not grind it nor wash it; it is fine enough of it self, only temper it with your finger in a gallipot, or oyster-shell, with gum-water, and it will be ready for use; if you put a little yellow berries amongst it, it will make the brighter colour; this is principally used for garments.

9. *Lake* is an excellent *crimson* colour; with it you may shadow vermilion, or your yellow garments in the darkest places; with it you may make a sky colour, being mixed only with white; with it you may make a flesh colour, sometimes mixed together with white and a little red-lead; it is an excellent colour itself, to colour garments or the like.

*Indian lake* is the best lake, but too good to be used to wash prints with, unless you intend to bestow great curiosity upon your works; but the best sort of ordinary lake will serve well enough for ordinary uses, but that also will be somewhat more costly.

Therefore, instead thereof, you may use red ink thickened upon the fire, and it will serve very well for your purpose, and better than lake, unless it be very good.

*Note*, if you would make a light sky colour of your red ink, or if you would mix it amongst your flesh colour, you must not thicken it; you should rather chuse to shadow your vermilion with *Spanish brown*, than thick red ink, which will serve well for that purpose, but is not altogether so bright a colour and clean.

10. *Red-lead* is the nearest to an orange colour, and putting a little yellow berries into some of it, will make a perfect orange colour; but if you mean to make flesh colour of it, you must  
put

put no yellow, but only when you would make an orange colour. This colour is used in colouring of buildings, or high-ways in landscape, being mixed with a little white.

Also it is the only bright colour to shadow yellow garments with, to make them shew like changeable taffety. It is good also to colour any light ground in a picture, taking only the thin water of it, and so for several other uses, as you shall see occasion for it.

11. *Yellow berries* are most used in washing of all other colours; they are bright and transparent, fit for all uses, and will be sufficient, without the use of any other yellow.

12. *Saffron* is a deep yellow, if you let it stand a pretty while; it is good principally to shadow yellow berries with instead of red-lead, and it is somewhat of a brighter shadow; but you may make shift well enough without this colour, for red-lead and yellow berries make just such another colour.

13. *Masticote* is a light yellow just like yellow berries and white, and therefore you may make shift well enough without it, only for saving you a labour to mix your yellow berries with white, when you have occasion for a light yellow, which you may sometimes make use of to colour a light ground in a picture, and then shadow it with the water of burnt *umber* or *red-lead*, that is the thinnest part of the colour.

14. *Cerufs* is the best white, if it be good and finely ground, or for want of it, white lead picked; either of these will serve well enough, for either of them being mingled with another colour make it lighter, and the more you put, the lighter they will be.

15. *Spanish brown* is a dirty brown colour, but of no great use to colour any garment with, unless it be an old man's gown; to shadow *vermilion*, or to lay upon any dark ground behind a picture, or to shadow yellow berries in the darkest places, when you want lake or thin red ink.

16. It is the best and brightest colour, when it is burnt in the fire till it be red hot; tho' if you would colour any hare, horse, dog, or the like, you must not burn it; but for other uses, it is best when it is burnt; for instance, to colour any wooden post, bodies of trees, or any thing else of wood, or any dark ground in a picture. It is not to be used about any garments, unless you would colour many old mens gowns or caps standing together, because they must not be all of one colour; therefore, for distinction and variety's sake, you may use umber unburnt for some of them.

17. *Printer's black* is most used, because it is easiest to be had, and serves very well in washing.



*Note*, You must not put any black amongst your colours to make them dark, for it will make them dirty; neither should you shadow any colour with black, unless it be *Spanish* brown, when you would colour an old man's gown that requires to be done of a sad colour; for whatsoever is shadowed with black, will look black, and not bright, fair and beautiful.

18. *Ivory burnt*, or for want of that, *bone burnt* is the blackest black, and is thus made; take ivory, or for want of it, some white bone, and put it into the fire till it be thoroughly burned; then take it out, and let it cool; slit it, take out the blackest of it in the middle, and grind it for your use.

COMELINESS is represented in painting, &c. by a beautiful nymph of a graceful aspect in changeable taffety, on her girdle is embroidered a *Cupid* and *Mercury's* rod, holding the corn marigold in her right hand, and the bird wagtail in her left.

Every fair face is not comely. *Vultu pulchro magis quam venusto*, Gracefulness to beauty is like salt to meat, gives it a relish; the girdle of *Venus* was of needle-work, and had the virtue to get love; the wagtail, because it was thought to have in it an innate power to excite amorous thoughts, and they say a man *lyngem habet*, who is so graceful that he charms.

COMMERCE is represented in painting, &c. by a man with his fore finger pointing to two mill-stones standing by him; a stork on his right arm, and a buck at his feet.

The two mill-stones denote action and commerce, for being double, the one can do nothing without the other, nor grind any corn alone. The storks help one another in flying, and the bucks in swimming.

COMMONWEALTH is represented in painting by a lady resembling *Minerva*, holding an olive branch in one hand, and a shield; and in the other a javelin, with a helmet on her head.

Her deportment, like *Minerva*, shews that wisdom is the principle of good government; the helmet, that the republick ought to be well fortified and secured from foreign force. The olive and dart, that peace and war are both beneficial to the Commonwealth; war, because by experience valour is attained; peace, because by leisure prudence to govern is acquired.

COMPASSION. The lively attention to the misfortunes of others, which is call'd compassion, causes the eye-brows to sink towards the middle of the forehead; the eye-ball to be fixt upon the object; the sides of the nostrils next the nose to be a little elevated, making wrinkles in the cheeks; the mouth to be open; the upper lip to be lifted up and thrust forwards; the muscles and all the parts of the face sinking down and turning  
towards

towards the object which causes the passion. And by these expressions it is to be represented in drawing. See the plate.

COMPASSION is represented in painting, &c. by a woman holding a pelican's nest in her left hand, who piercing her breast, seems to suckle her young ones with her blood; she extends her hand in a compassionate manner to bestow charity on the indigent.

The pelican is a true emblem of compassion, for she is said never to stir from her young, and when her nourishment fails, she feeds them with her own blood. Her extended hand denotes her readiness to relieve with her own substance.

COMPLAINT to GOD is represented in painting, &c. by a woman clothed in a white veil, of a sorrowful countenance, looking up to heaven; laying one hand upon her breast, shewing the other bitten by serpents.

Her cheeks bathed in tears, demonstrate her complaint; her looks, that she directs her complaint to God; her hands denote the reason of her complaint to be some offence, signified by the serpents; her white raiment and hand upon her breast denote innocence.

COMPOSITION is putting together for the advantage of the whole, what shall be judged proper to be the several parts of a picture; either as being essential to it, or because they are thought necessary for the common benefit: And moreover, the determination of the painter, as to certain attitudes and colours, which are otherwise indifferent.

The Composition of a picture is of vast consequence to the goodness of it; 'tis what first of all presents itself to the eye, and prejudices us in favour of, or with an aversion to it; 'tis this that directs us to the ideas that are to be conveyed by the painter, and in what order; and the eye is delighted with the harmony at the same time as the understanding is improved. Whereas this being ill, tho' the several parts are fine, the picture is troublesome to look upon, and like a book, in which are many good thoughts, but flung in confusedly, and without method.

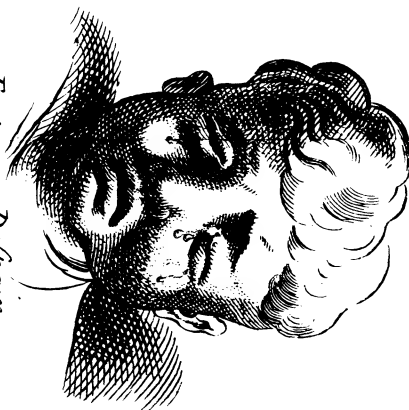
Every picture should be so contriv'd, as that at a distance, when one cannot discern what figures there are, or what they are doing, it should appear to be composed of masses, light and dark; the latter of which serve as repotes to the eye. The forms of these masses must be agreeable, of whatsoever they consist, ground, trees, draperies, figures, &c. and the whole together should be sweet and delightful, lovely shapes and colours, without a name; of which there is an infinite variety.

And 'tis not enough that there be great-masses; they must be subdivided into lesser parts, or they will appear heavy and disagreeable.

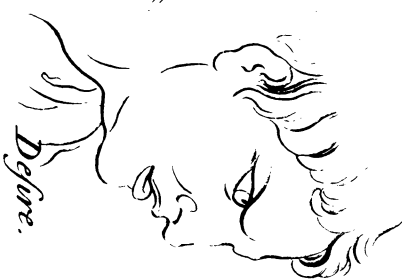
*Dejection.*



*Crying.*



*Plac. III.  
Compassion.*



*Enam.*



*Extreme Despair.*



*Defire.*



*Fear.*



*Unger trust w. Fear.*



*Fear.*





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agreeable. Thus, tho' there is evidently a broad light (for example) in a piece of silk, when covering a whole figure, or a limb, there may be lesser folds, breakings, flickerings, and reflections, and the great mass yet evidently preserv'd.

Sometimes one mass of light is upon a dark ground, and then the extremities of the light must not be too near the edges of the picture, and its greatest strength must be toward the centre; as in the descent from the cross, and the dead Christ, both of *Reubens*, and of both which there are prints, one by *Vosterman* and the other by *Pontius*.

Mr. *Richardson* has a painting of the Holy Family by *Reubens* of this structure; where, because the mass of light in one part, would else have gone off too abruptly, and have made a less pleasing figure, he has set the foot of *S. Elizabeth* on a little stool: here the light catches, and spreads the mass so as to have the desired effect. Such another artifice *Rafaelle* has used in a madonna, of which Mr. *Richardson* has a copy; he has brought in a kind of an ornament to a chair for no other end (as may be imagined) but to form the mass agreeably.

*Van Dyke*, that he might keep his principal light near the middle of his picture, and to advantage the body which he seems to have intended to exert himself in, has even kept the head sombrous in an *ecce homo*, which Mr. *Richardson* has of his, and makes the whole have a fine effect.

The same author says, he has many times observ'd with a great deal of pleasure the admirable composition (besides the other excellencies) of a fruit-piece of *Michael Angelo Compadoglio*. The principal light is near the centre (not exactly there, for those regularities have an ill-effect,) and the transition from thence, and from one thing to another, to the extremities of the picture all round, is very easy and delightful; in which he has employed fine artifices by leaves, twigs, little touches of lights striking advantageously, and the like. So that there is not a stroke in the picture without its meaning; and the whole, tho' very bright, and consisting of a great many parts, has a wonderful harmony and repose.

Sometimes the structure of a picture, or the *tout-ensemble* of its form, shall resemble dark clouds on a light ground; as in two assumptions of the Virgin by *Bolswert*, after *Rubens*. *Le Brun* in a ceiling of the same subject, grav'd by young *Simconneau*, has put a group of angels, which almost hide the cloudy *voiture* of the Virgin; but this mass is of too regular and heavy a shape.

There are instances where two masses, a light and a dark one, divide the picture, each possessing one side. Of this sort is one done by *Rubens*, and as fine a composition as can be seen;

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the masses are so well rounded, the principal light being near the middle of the bright one, and the other having subordinate lights upon it, so as to connect, but not to confound it with the rest ; and they are in agreeable shapes, and melting into one another, but nevertheless sufficiently determined.

Very commonly a picture consists of a mass of light, and another of shadow upon a ground of a middle tinct. And sometimes 'tis composed of a mass of dark at the bottom, another lighter above that, and another for the upper part still lighter ; (as usually in a landscape) sometimes the dark mass employs one side of the picture also. As a certain copy after *Paolo Veronese*, where is a large group of figures, the principal ones of the story compose this lower brown mass ; architecture, the second ; more buildings with figures and the sky, the third ; but most commonly in pictures of three masses, the second is the place of the principal figures.

Of such consequence are these agreeable masses in a picture, that for the sake of them, what is less material in a picture, must be dispens'd with when both cannot be had. As the principal figure and action must be distinguish'd, those limbs of a figure that are chiefly employed, ought to be made conspicuous.

As the *tout-ensemble* of a picture must be beautiful in its masses, so must it be as to its colours. And as what is principal must be (generally speaking) the most conspicuous, the predominant colours of that should be diffus'd throughout the whole. This *Rafaëlle* has remarkably observ'd in the cartoon of *St. Paul* preaching ; his drapery is red and green, and these colours are scatter'd every where, but judiciously ; for subordinate colours, as well as subordinate lights, serve to soften and support the principal ones, which otherwise would appear as spots, and consequently be offensive.

And when the subject does not necessarily require a due variety or beauty of tincts ; or perhaps the picture, when thought to be finish'd, is found to want something of this kind, a few red, or yellow leaves of trees, flowers of whatever colour, in short, any thing otherwise indifferent may be flung in very advantageously.

In a figure, and every part of a figure, and indeed in every thing else, there is one part which must have a peculiar force, and be manifestly distinguished from the rest, all the other parts of which must also have a due subordination to it, and to one another. The same must be observ'd in the composition of an entire picture ; and this principal, distinguish'd part ought (generally speaking) to be the place of the principal figure and action : and here every thing must be higher finish'd ; the other parts must be less so, gradually.

In

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In the descent from the cross of *Reubens*, the *Christ* is the principal figure. This body being naked and about the centre of the picture, would have been distinguished as the heightening of this mass of light; but not content with that, and to raise it still more, this judicious master has added a sheet in which the body is, and which is suppos'd to be useful to deliver it down safely, as well as to carry it off afterwards, but the main design is what I am observing, and for that 'tis admirably introduc'd.

*Ananias* is the principal figure in the *carton* which gives the history of his death, as the Apostle that pronounces his sentence is of the subordinate group, which consists of Apostles, (which therefore is subordinate, because the principal action relates to the criminal, and thither the eye is directed by almost all the figures in the picture.) *S. Paul* is the chief figure in that carton, where he is preaching; and amongst his auditors one is eminently distinguish'd, who is principal of that group, and is apparently a believer, and more so than any of them, or he had not had that second place in a picture conducted by so great a judgment as that of *Rafaëlle's*.

These principal and subordinate groups and figures are so apparent, that the eye will naturally fix first upon one, then upon the other, and consider each in order, and with delight. Where 'tis not thus, the composition is less perfect.

It is to be noted, that the forcerer in the carton of his chastisement, is the principal figure there, but has not the force in all its parts as it ought to have as such, and to maintain the harmony. This is accidental, for 'tis certain his drapery was of the same strength and beauty as that on his head, however it has happen'd to have changed its colour.

The shadows in the drapery of *S. Paul* also, in that carton, where the people are about to sacrifice to him and *Barnabas*, have lost something of their force.

Sometimes the place in the picture, and not the force, gives the distinction; and sometimes the painter happens to be obliged to put a figure in a place, and with a degree of force which does not sufficiently distinguish it. In that case, the attention must be awaken'd by the colour of its drapery, or a part of it, or by the ground on which 'tis painted, or some other artifice.

Scarlet or some vivid colour is very proper on such occasions. In a picture of *Albano*, which Sir *James Thornhill* had, our Lord is seen at a distance as coming towards some of his disciples; and tho' a small figure, is nevertheless the most apparent in the picture by being placed on a rising ground, and painted upon a bright part of the sky just above the horizon.



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In a composition, as well as in every single figure, or other part of which the picture consists, one thing must contrast, or be varied from another. Thus in a figure, the arms and legs must not be plac'd to answer one another in parallel lines. In like manner, if one figure in a composition stands, another must bend, or lye on the ground ; and of those that stand, or are in any other position, if there be several of them, they must be varied by turns of the head, or some other artful disposition of their parts, as may be seen (for instance) in the *carton* of giving the keys. The masses must also have the like contrast, two must not be alike in form or size, nor the whole mass composed of those lesser ones of too regular a shape. The colours must be also contrasted and oppos'd, so as to be grateful to the eye. There must not (for example) be two draperies in one picture of the same colour and strength, unless they are contiguous, and then they are but as one. If there be two reds, blues, or whatever other colour, one must be of a darker or paler tinct, or be some way varied by lights, shadows, or reflections. *Rafaelle*, and others, have made great advantage of changeable silks to unite the contrasting colours, as well as to make a part of the contrast themselves. As in the *carton* of giving the keys, the Apostle that stands in profile, and immediately behind St. *John*, has a yellow garment with red sleeves, which connects that figure with S. *Peter* and S. *John*, whose draperies are of the same species of colours. Then the same anonymous Apostle has a loose changeable drapery, the lights of which are a mixture of red and yellow, the other parts are bluish. This unites it self with the other colours already mention'd, and with the blue drapery of another Apostle which follows afterwards ; between which, and the changeable silk, is a yellow drapery, something different from the other yellows, but with shadows bearing upon the purple, as those of the yellow drapery of St. *Peter* incline to the red. All which, together with several other particulars, produce a wonderful harmony.

The exotick birds that are placed on the shore, in the foreground in the carton of the draught of fishes, prevent the heaviness, which that part would otherwise have had, by breaking the parallel lines, which would have been made by the boats, and base of the picture.

Though a mass may consist of a number of little parts, there ought to be one, or more, larger, and as it were, governing the rest, and this is another sort of contrast. The Lord *Burlington* has a good *Samaritan* by *Bassau*, which is a fine instance of this. In the same picture, there are two knees of two several figures, pretty near together, and the legs and thighs of which make angles too much alike ; but this is contrasted by one being  
naked,

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naked, and the other clad, and over the latter a little sort of fash falls, which is an additional expedient.

There is an admirable contrast in the carton of *St. Paul* preaching. His figure (which is a rare one) stands alone as he ought to do, and consequently is very conspicuous, which is also perfectly right. The attitude is as fine as can be imagin'd; but the beauty of this noble figure, and with it of the whole picture depends upon this artful contrast I have been speaking of; of so great consequence is that little part of the drapery flung over the Apostle's shoulder, and hanging down almost to his waste; for (besides that it poizes the figure, which otherwise would have seem'd to have tumbled forwards) had it gone lower, so as to have as it were divided the out-line of the hinder part of the figure in two equal, or near equal parts, it had been offensive; as it had been less pleasing, if it had not come so low as it does. This important piece of drapery preserves the mass of light upon that figure, but varies it, and gives it an agreeable form; whereas without it, the whole figure would have been heavy and disagreeable: but there was no danger of that in *Rafaelle*.

The naked boys in the carton of healing the cripple, are a farther proof of *Rafaelle's* great judgment in composition. One of 'em is in such an attitude as finely varies the turns of the figures; but here is moreover another kind of contrast, and that is caused by their being naked, which how odd soever it may seem at first, and without considering the reason of it, will be found to have a marvellous effect. Cloath 'em in imagination; dress 'em as you will, the picture suffers by it, and would have suffered, if *Rafaelle* himself had done it.

'Tis for the sake of this contrast, which is of so great consequence in painting, that this knowing man in the carton we are now upon, has plac'd his figures at one end of the temple, near the corner, where one would not suppose the beautiful gate was. But this varies the sides of the picture, and at the same time gives him an opportunity to enlarge his buildings with a fine portico, the like of which you must imagine must be on the other side of the main structure; all which together makes one of the noblest pieces of architecture that can be conceived.

He has taken a greater licence in the carton of the conversion of *Sergius Paulus*, where the architecture will be difficult to account for, otherwise than by saying, it was done to give the contrast we are speaking of. But this will justify it sufficiently.

Nor is this contrast only necessary in every particular picture; but if several are made to hang in one room, they ought to contrast one another. This *Titian* considered, when he was making several pictures for King *Henry VIII.* as appears by a

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letter he wrote to that Prince, which (amongst others of *Titian* to the Emperor and other great men) is to be found in a collection of letters, printed at *Venice*, ann. 1574.

There is another sort of contrast, which it is to be wonder'd painters have not more consider'd than we generally find, and that is, making some fat, and some lean people; such a face and air as Mr. *Locke's*, or Sir *Isaac Newton's*, would shine in the best composition that ever *Rafaëlle* made, as to express their characters, would be a task worthy of that divine Hand. In the cartons, there is one or two figures something corpulent, but I think not one remarkably lean.

The masters to be studied for composition are *Rafaëlle*, *Rubens* and *Rembrandt* most especially, though many others are worthy notice, and to be carefully consider'd; amongst which, *V. Velde* ought not to be forgotten, who tho' his subjects were ships, which consisting of so many little parts, are very difficult to fling into great masses, has done it by the help of spread sails, smoak, and the bodies of the vessels, and a judicious management of light and shadows. So that his compositions are many times as good as those of any master.

The more to be convinc'd of the advantage of composition, as well as the better to comprehend what I have been saying, it may not be amiss to compare some of those things, I have instanced in as good, with others that are not so; such as the famous descent of the cross by *Daniele da Volterra*, where all is confusion; the crucifixion of our Lord between two thieves by *Rubens*, grav'd by *Bolswart*, where, tho' they are distinct, they are of disagreeable forms, and unconnected.

CONCORD is represented in painting, &c. by a grave beautiful lady in an antique dress, holding in her right hand a bason with a heart and pomegranate in it, and a garland of fruits and flowers on her head, and in her left a scepter; on the top of which are various flowers and fruits.

The heart and pomegranate denote *Concord*, because the pomegranate is full of little grains closely united, to that degree, that if the roots be separated, they mutually twist together again.

CONCORD is also represented in painting, as a lady in a sky coloured robe and a yellow mantle, holding in her right hand a charger for sacrifice, and in her left, a *cornucopia* with the word *concordia*: or thus; as a fair virgin, holding in one hand a pomegranate, and in the other a bunch of myrtle.

The reason of which is, that the nature of these trees is such, that if they are planted, although at a good space from one another, they will meet, and with twining embrace one another.

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**CONFIDENCE** is represented in painting, &c. by a woman with her hair hanging about her ears, bearing up a ship with both her hands. The ship shews, that although the sea be terrible, yet she is confident, that by the help of this ship, she may trust herself with that barbarous element threatening ruin and destruction.

**CONJUGAL LOVE** is represented in painting, &c. by a man at a woman's right hand, both clad in purple, one gold chain encircles both their necks, having a heart for a pendant supported only by one hand of each.

The chain denotes matrimony, ordain'd by nature and the divine law, which would have the husband and wife to be one flesh and bone, not to be separated but by death.

**CONNOISSANCE**, [in painting] a skill in that particular science. See *Connoisseur*.

**CONNOISSEUR**. It is not enough, says Mr. *Richardson*, to be an ingenious man in general, nor to have seen all the finest things in *Europe*, nor even to be able to make a good picture, much less the having the names and something of the history of the masters; all this will not render a man a good *Connoisseur*, to be able to judge of the goodness of a picture; most of those qualifications are necessary, which the painter himself ought to be possess'd of, that is all that are not practical; he must be master of the subject, and if it be improvable, he must know it to be so, and wherein; he must not only see and judge of the painter, in what he has done, but must know moreover, what he ought to have done; he must be acquainted with the passions, their nature, and how they appear on all occasions.

He must have a delicacy of eye, to judge of harmony and proportion of beauty of colours and accuracy of hand; and lastly, he must be conversant with the better sort of people, and with the antique, or he will not be a good judge of grace and greatness. And he must have not only a solid, but an unbiassed judgment.

The knowledge of history is absolutely necessary to a *Connoisseur*, not only that which may enable him to judge, how well the painter has manag'd such and such a story, which he will have frequent occasion to do; but the particular history of the arts, and especially of painting.

**CONSCIENCE** is represented in painting, &c. by a lady with a heart in her hand before her eyes, where is written in letters of gold, ΟΙΚΕΙΑ ΣΥΝΕΣΙΣ, that is ones own *Conscience* standing on her legs, between a flowry meadow and a field full of thorns and briars.

The heart shews, that none can be hid from himself, the flowers and thorns, that there are two ways, good and bad, the

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part of *Conscience* is to chuse; in the one, we meet the prickings of vice, in the other, the fragrant smell of virtue.

CONSTANCY is represented in painting, &c. by a woman embracing a pillar with her right arm, and holding a drawn sword in her left hand over a fire on the altar, as if she had a mind to burn her arm and hand.

The column shews her stedfast resolution not to be overcome, the naked sword, that neither fire nor sword can terrify courage arm'd with *Constancy*.

CONTAGION is represented in painting, &c. by a young maid in a mournful pitiful habit, she holds a walnut branch in one hand, and lays the other on a basilisk with a terrible aspect; on the other side is a stripling languid and sickly, lying half dead upon the ground.

Young, because more subject to infection by disorderly living and carelessness; pale and languid denotes the virulency consuming by degrees, the habit the doleful condition of the infected, ending often in death, the bough denotes *Contagion*, as does the basilisk, whose very breath and looks are contagious.

CONTENTMENT is represented in painting, &c. by a spark pompously adorn'd with a sword by his side, the ornaments on his head are a plume of feathers and jewels, a looking glass in one hand, and in the other, a silver basin clapt to his thigh full of money and jewels.

He looking in the glass shews, that if a man be ignorant of his own good, he cannot be content, therefore looks upon his own fine clothes, money and jewels, with much satisfaction and content.

CONTOUR, [in painting, &c.] the out-line or that which terminates and defines a figure.

A great part of the skill of the painter consists in managing the *Contours* well.

The *Contour* of a figure makes what we call the *draught* or *design*.

The *Italian* painters ordinarily call the lineaments of the face, the *Contour* of it.

CONTRAST in painting and sculpture, expresses an *opposition* or difference of position, attitude, &c. of two or more figures, contriv'd to make variety in a painting.

Thus when in a group of three figures, one is shewn before, another behind, and a third sideways, there is said to be a *Contrast*.

M. de Piles defines *Contrast* an opposition between the lines, which form objects, by means whereof they set off one the other.

A *Contrast* well managed, is one of the greatest beauties of a painting.

The

The *Contrast* is not only to be observ'd in the position of several figures, but also in that of the several members of the same figure; thus if the right arm advance the furthest, the right leg is to be hindmost, if the eye be directed one way, the arm to go the contrary way, &c.

The *Contrast* also must be pursued even in the drapery.

CONVERSATION is represented in painting, &c. by a young man with a smiling countenance clothed in green, a laurel garland on his head, a *Mercury's* rod in his hand, twisted about with a myrtle, and pomegranate and a human tongue at the top with a scrawl on which is written *væ soli*.

His posture shews him inclin'd to entertain somebody, the scrawl woe to him that is alone; the two branches shews mutual amity by conversation, the tongue expresseth the mind in company.

CONVERSION is represented in painting, &c. by a naked lady at years of discretion holding a green ribbon inscribed in *te Domine speravi*; on the ground are splendid garments, she looks up to heaven whence proceeds a ray, she is bathed in tears, her hands a-cross, a *Hydra* at her feet gaping.

Fair denotes *Conversion* to God, her years, her being averse from all excesses, her nakedness, purity, and despoil'd of all worldly affections by her rich garments upon the ground.

HENRY COOK, was an *English* gentleman and history painter, he was not only a great critick in painting, but also a good performer, as appears in many publick pieces of his, viz. the altar-piece at *New College Chapel* in *Oxford*, what he has done at *Chelsea*, at *Hampton-Court* on many cielings and stair cases of this town and kingdom. He painted many fine copies of the *Cartoons* of *Raphael*, &c. which are particularly remarkable, being drawn in turpentine oil, after the manner of distemper; of which he is said to have been the inventor, he died in *London*, November 18. 1700, aged near fifty eight, and lies buried in *St. Giles's* church.

Mr. SAMUEL COOPER, born in the year 1609, a scholar of Mr. *Hoskins*, and studied *Vandike* or *Van-Dick*, liv'd at *London*, excell'd in portraits and miniature, died in the year 1672, aged sixty three years.

Samuel COOPER, born in *London* 1609. was an imitator of *Van Dyck*.

His pencil was generally confin'd to a head only, and indeed, below that part he was not always so successful as could be wish'd, but for a face and all the dependencies of it, viz. the graceful and becoming air, the strength, relievo and noble spirit; the softness and tender liveliness of flesh and blood; and the loose and genteel management of the hair. His talent was so extraordinary

traordinary and for the honour of our nation, it may without vanity be affirmed, he was (at least) equal to the most famous *Italians*, and that hardly any one of his predecessors has ever been able to shew such perfection in so narrow a compass; he died *anno* 1672, and lies buried at *Pancras* church, aged sixty three.

ALEXANDER COOPER, was the elder brother of *Samuel Cooper*, Esq; he perform'd well in miniature, and going beyond sea, became limner to *Christiana* Queen of *Sweden*; yet was far exceeded by his brother *Samuel*, who was much the greater master. He did likewise a landscape in water colours exceeding well, and was accounted an extraordinary draftsman.

COPAL. A gum of an agreeable smell, resembling that of incense brought from *New-Spain*, where it oozes out from incisions made in the bark of a large tree, much after the manner in which the vine yields its water, when cut in the spring.

'Tis very rare, when good, 'tis of a fine transparent yellow and melts easily.

For want of this, there is another kind brought from the *Antilles*, which is almost the only one known among the druggists. Its chief consumption is in making *varnish*.

### *Of the CHOICE of COPIES.*

1. In chusing a pattern to draw by, you ought to observe, first, that it be well design'd, secondly, that it be well cover'd.

2. As to the well designing, see that it be true in every part, and that the proportion of the figure be just and answer to the life.

3. If the picture be a fiction, see that it be done boldly, not only to exceed the work (but also the possibility) of nature, as in *centaurs*, *satyrs*, *syrens*, *flying horses*, *sea-horses*, *tritons*, *nereids*, &c.

4. Natural figures shew property, and are requir'd to agree with the life; forced figures express novelty, and are to be beautified by exorbitancies according to the fancy of the painter, without limitation; novelty causes admiration, and admiration, curiosity, and a kind of delight and satisfaction.

In the well colouring, know, that in obscurity or darkness, there is a kind of deepness; the sight being sweetly deceiv'd gradually in breaking the colours, by insensible change from the more high to the more dull.

In the rainbow this mixture is perfect; the variety of colours are thoroughly dispers'd (like atoms in the sun beams) among one another to create its just appearance.

See that the swellings of the work agree to the exactness of nature, and as the parts thereof require, without sharpness in outlines, or flatness within the body of the piece,



## C O P

As also, that each hollownefs exactly corresponds to due proportions.

Laftly, view with attention the paſſions, as joy, ſorrow, love, hatred, fear, hope, &c. and ſee that they correſpond with their proper poſtures; for a touch of the pencil may ſtrangely alter a paſſion to its juſt oppoſite or contrary, as from mirth to mourning, &c.

COPPER, a hard, dry, heavy, ductile metal, found in mines in ſeveral parts of *Europe*; but moſt abundantly in *Sweden*.

*Copper* is of all metals the moſt ductile and malleable, after gold and ſilver.

By an analyſis it appears to be compos'd of a ſulphur ill digeſted, a yellowiſh mercury and a red ſalt.

It is found both in duſt and in ſtones; each of which are firſt well waſh'd, to ſeparate them from the earth, wherewith they are mixt. In this ſtate 'tis call'd *Virgin Copper*.

After it has been waſh'd, 'tis melted, and the melted matter is run into a kind of moulds, to form large blocks, by ſome call'd *Salmons*, and by others *Pigs of Copper*.

In order to render it more pure and beautiful, they melt it again once or twice; ſome of its coarſe, earthy parts being left each fuſion, and a quantity of tin and antimony added in each. In this ſtate it is call'd *Roſe Copper*.

Of a mixture of this and *lapis calaminaris* is form'd braſs.

*Copper* melted together with twenty two or twenty three pounds of fine tin *per quintal* makes bell metal.

*Copper* melted with calamine quantity for quantity makes braſs.

*Copper* and braſs melted in equal quantities make what the *French* call *Bronze*, us'd for figures, ſtatues, &c.

*Copper* turns white by an unction of ſpirit of wine and orpiment.

*Pliny* ſays there is a *Copper* naturally white, found underneath the ſilver mines.

The uſe of *Copper* is very extenſive; among other works of *Copper* may be reckon'd thoſe of braſs, bell metal, pot metal, &c. which are all compositions where *Copper* makes the prevailing ingredient.

*To blanch COPPER.* Take arſenick eight ounces, ſal-nitre and white *tartar*, of each two ounces, *borax* one ounce, reduce them to fine powder, cement the *Copper* therewith, by laying thin plates, layer upon layer, after forty eight hours of a cementing heat, (the crucible being ſtrong, well ſtopt, cover'd and ſtrongly luted) encrease the fire and cauſe it to melt all down together.

*Another*

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*Another way to do the same.* Take white wine vinegar, strong lye made of wood ashes so strong as to bear an egg, of each four pounds, sulphur and hog's blood of each one pound, powder the *sulphur* and mix all together, and digest in an earthen pot close covered for eight days, then strain it.

2. Take eight pounds of *Copper*, melt it and quench it in the aforesaid lye, do this four times, and then will the *Copper* be in measure prepar'd.

3. Take white arsenick, sheeps suet tied up of each a pound, white lead four ounces, put them all together in a kettle keeping continually stirring them till they boil to a powder which keep for use.

4. Take the *Copper* before prepar'd, and melt it again a fifth time, to which put a little of your prepar'd powder of *arsenick* by little and little at a time (the *Copper* being first melted) stirring it with a wooden stick till it is dissolv'd in the metal, then cast it into an ingot.

The former powder will serve for eight pounds of *Copper*.

*Another way.* Take sublim'd *arsenick* two ounces, common salt two ounces, sublime them together three times, then is it fixed.

2. Take fine *silver* in filings or leaves half an ounce, *mercury sublimate* a sufficient quantity, grind them well upon a marble stone, to which add the former prepar'd *arsenick* with some fixed *sal armoniac*.

3. Grind them well together with wine vinegar distill'd, in which some *borax* has been dissolv'd; then let them dry, when they are dry wet them again with the said vinegar, and dry them again upon a soft fire, do so five times.

4. Take fine silver one ounce, and as much of the aforesaid composition, of the prepar'd *Copper* eight ounces, mix and melt them together, and it will be in appearance next to perfect.

*To fix SAL ARMONIAC for this work.* 1. Take *Sal Armoniac* sublim'd to a perfect whiteness, put it into a glass alembick with head and receiver, casting upon the *Sal Armoniac* some good distill'd vinegar, so as to cover it a hand's breadth, and distil it with a soft fire.

2. Then put upon it more fresh *vinegar* and distil again, repeat this till the *Sal Armoniac* remains in the bottom, afterwards let the fire go out of itself, and keep the oil close stoppt for use.

3. If you take *mercury* two ounces, and make it hot in the fire, then drop on it three drops of the oil, and the *mercury* will be congeal'd into a pure metal; of this one part will make ten parts of *Copper*, as fair as *silver*; the ten parts of *Copper* being first melted and the *mercury* one part being cast upon it.

## C O P

*To fix ARSENICK.* Take a strong lye of ashes and *quick lime*, filter it and dissolve *Arsenick* with it, then evaporate the humidity by boiling, and the *Arsenick* will be prepar'd and fixt.

*To whiten COPPER or BRASS superficially.* Take *sal armoniac*, *alum*, *nitre* of each alike quantity, put to them a little filings of *silver* refin'd or *leaf silver*; mix them well together, and put it into the fire till it be red hot in a crucible, and till it has done smoaking. Then moisten this powder with spittle, and rub either *Copper* or *Brass* with it, and it will be white.

*To whiten COPPER or IRON.* Take calx of *silver*, grind it with two parts of calcin'd precipitate of *arsenick*, and one part of white precipitate *mercury*, imbibe them with water made of *sal nitre*, *sal armoniac*, and litharge of each equal parts, and this till they have drunk up their weight of the water, put one part of it on four parts of prepar'd *Copper* or *Iron*.

*Another way to do the same.* Take calcin'd *silver*, *tin* calcin'd and dissolv'd of each a like quantity, mix, dry and cover it with twice as much sublimed *arsenick*.

*Another way.* Take calcin'd *silver*, *arsenick*, sulphur sublim'd and ground, *sal armoniac* of each a like quantity, mix and sublime all three times, and cast one part upon six parts of prepar'd *Iron* or *Copper*.

*Another.* Take *realgar* one ounce, *quicksilver* sublim'd three ounces, *tartar* calcin'd one ounce, grind and incorporate them, and put them into a vial with a neck twelve inches long, and its orifice so wide that two fingers may enter; lute it and set it over a fire cover'd with a cloth.

First make a gentle fire for a quarter of an hour; afterwards augment the fire underneath, and round about till the furnace be very hot and red; when all is cold, break the vessel and take out the metalline matter. This may easily be brought to perfection.

*Another for the same purpose.* Upon *tutia* sublime one part of *mercury* sublimate, and two parts of *arsenick* sublim'd until it shall have ingress. This clearly and very speciously sublimes *Copper*.

*The way to calcine little plates of COPPER to tinge glass of a blue colour.* We have shewn the way to make *crocus martis* for colouring glass, and now we will shew that of copper, which is very near in nature to the other, and which dissolves in the same acids and corrosives. *Venus* as well as *Mars* (or copper as well as iron) give us different colours, which proceed from different ways of preparing them.

*Merret* pretends that *brass* gives us a finer blue than *copper*, by reason of the *lapis calaminaris*, which is mixt with it, and partly causes the colour.

Of

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Of all metals, *Copper* is only used (as allay) to give malleability to gold and silver in coin; it melts easy in an indifferent heat, but it is calcined into powder with difficulty. There are several ways of calcining copper; here follows five of them, by help of fire. The first is of *Copper* alone, without any addition; the second, by the addition of *sulphur*; the third, by *vitriol*; the fourth, of *brass* alone divers ways; the fifth, by a preparation of *vitriol* of *Venus*. These preparations are the best; and of more value than those prepared by spirits and corrosives.

The little plates or leaves, whereof we are now to shew the preparation, are a sort of *copper* or *brass* exceeding thin, approaching the colour of gold called festoons; these plates are made of this colour by *lapis calaminaris*, which does not only colour the *Copper*, but augments its weight. This *brass* being well calcin'd, tinges glass of a blue and sea green; the way to calcine it is thus.

To avoid the expence of buying new, you may make use of those leaves which have been already used and work'd, they being good, and cut them with scissars into little pieces, and put them into a crucible covered and luted in the mouth of a furnace to calcine, and let them stand there four days, at a coal fire, so that the leaves may not melt, for then they would be unfit for this use. The four days being expired, the whole will be calcined; beat them on a porphyry stone, and searce them through a fine sieve, and you will have a blackish powder, which you must spread on tiles, and put it into the same furnace for four days longer; then take it off, and blow off the ashes that may be fallen on it; then reduce it again into powder, searcing it through a fine sieve as before, and keep it for use.

You may know when it is well calcined, if the glass rises and swells when you put it upon it; if it does not, you must calcine other leaves, those being not serviceable, by reason they are burnt in the calcination.

*Another way of calcining these leaves of COPPER, to make a very transparent red, yellow and chalcedony.* Take the same leaves as before-mentioned, cut them into small pieces, and stratify them with *sulphur* pulverized in a crucible, covered and luted; then set them on burning coals at the mouth of the oven to calcine for twenty four hours; then take it out, and grind it small; then put it into an earthen vessel in a reverberatory furnace, where leaving it ten hours, take it out and powder it, then keep it for use.

*COPPER, to calcine to a red powder, which serves in several processes for colouring glass.* Altho' copper be of the same nature as brass, which serves to colour glass blue, yet there is some difference between them; for the latter will tinge it of several

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veral colours, which proceeds from the *lapis calaminaris*, and some other mixtures in the preparation.

To make this powder, take copper in thin plates, what quantity you please, put it in a large crucible, and set it into a furnace, 'till it be calcin'd, without melting; then being cool'd, reduce it into powder, which will be very red, and searce it; of this divers uses may be made, as will be shewn in many places.

*To calcine COPPER thrice for colouring glafs.* The same red powder in the preceding chapter serves here.

Lay that powder on tiles, and calcine it again in the furnace for four days, and it will become black, and coagulated into one mass.

Reduce it to powder and searce it, and calcine it again for five or six days in the same furnace, and it will become grey, without coagulating any more, or running into lumps, and will be in a condition fit to be dissolv'd.

This powder the *Italians* call *ramina di trecotte*, and of it is made a sky colour'd blue, the colour of *turkois*, the green of *emerald*, and several other colours.

It must not be calcin'd above three times, because it would no longer colour glafs.

It may be known whether it be calcin'd well, by casting some of it into a pot of boiling glafs; if it swells, it is enough; if not, it must be set again into the furnace for twenty four hours, or rather begin a new process.

*An easier and less chargeable way of making thrice calcin'd COPPER.* This, as it is less expensive, will also be almost equal in beauty.

Take scales made by braziers in making pots, kettles, and other works of brass, which is cheaper by far then new copper.

These scales need not be stratified, like the copper before mentioned, which is troublesome; there is no need of any thing but to wash them from all filth, to dry them well, and to put them into one or more crucibles, and to set them into the mouth of a reverberatory furnace for the space of four days. Then being at length cool'd, they are to be pounded or ground and searc'd.

Then the powder is to be set a second time into the same furnace to reverberate for four days more, and you will have little balls of a black colour, which must be pounded and searc'd again, and then put the third time into the reverberatory; then after four other days, reduce them to powder as before.

Thus will it be prepar'd with less expence, and as good for colouring of glafs; which may be known very easily, by making  
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ing a trial of it on melted glass; for if it makes it rise when you cast it on, it is right.

*To tinge COPPER of a gold colour.* Take *copper* and *lapis calaminaris*, of each eight drams, of *tutty* four drams. Heat the copper red hot twice, quenching it in urine, doing the like by the *lapis* and the *tutty*. Take of the dissolv'd copper an ounce, adding to it two ounces of honey; boil them till the honey look black, and is so dry, that it may be powdered, when beat with the *lapis* and *tutty*; then boil them again till the *copper* is melted, and it is done.

*Another way.* Take the *gall of a goat* and *arsenick* of each a sufficient quantity, and distil them; then wash the *copper*, being first made bright in this water, and it will change into the colour of gold.

*Another way.* Melt *Copper*, and put in a little *zink* in filings, and the *Copper* will have a glorious golden colour.

*To make COPPER of a white colour.* Take *sublimate* and *sal armoniack* of each a like quantity, boil them in vinegar, in which quench the *copper*, having first been made red hot, and it will be like silver.

*Another way.* Heat *copper* red hot divers times, and quench it in oil of *tartar per deliquium*, and it will be white.

*Another way.* Take *arsenick* an ounce and a half, *mercury sublimate* an ounce, of *azure* half an ounce; mix them with good and pure grease like an ointment, and with this anoint any copper vessel; then put that vessel into another, and set it into a digestive heat, letting it stand for two months; after which, cleanse it with a brush and water, and it is done.

*Another way.* Take calcin'd *arsenick* with *salt-petre*, and *mercury sublimate*, which cast upon melted copper, and it will be white like silver.

*To soften COPPER.* Melt burnt brass in a crucible with *borax*, quench it in *linseed* oil, and then beat it gently on an anvil; then boil it again, and quench it in oil as before; doing this five or six times till it is soft enough, and this will neatly unite with gold, of which you may put in more by half than you can of other brass.

**COPPER GREEN.** To make this, take a pound of right *French verdegrease* made at *Montpelier*, that being the best, because the *verdegrease* made at any other place will fade.

To this add three ounces of cream of tartar; let them be both reduc'd to a very fine powder; but be sure to take care to stop your nose while the *verdegrease* is pounding, and hold a bunch of fine linen in your mouth, to breathe through; or otherwise the subtil powder of the *verdegrease* will offend you.

When this is done, mix both the powders in two quarts of water, and boil them in an earthen pipkin to the consumption of one half; then set it by till it is cold; then strain it, and put the liquor into a glass bottle; stop it up, and let it stand to settle till the liquor be very clear, and so you will have a delicate green water for washing prints, &c.

But the *verdegrease* not being always of a goodness, sometimes the colour may not prove so deep as you would have it for some uses.

To remedy this, put some of it into a broad earthen dish, and set it over a chafing dish of coals, and by a gentle heat, cause so much of the liquid part to evaporate, till by trying on a paper, and letting of it dry, the colour is as you would have it.

Here you may note, that if it shine too much when dry, it is not as it ought to be, for it is not rightly made, if it does any more than just shine; and if you cannot make the colour by evaporating it (as before) without making it shine too much, the best way will be to add some more *verdegrease*, and boil it up again, till it becomes a transparent deep willow green.

COPPERAS } a mineral form'd in copper mines, and which  
COPERAS } is properly a kind of vitriol.

*Copperas* is purified and prepar'd in the same manner as alum and salt petre, by passing thro' several lixiviums till it be wholly reduc'd to crystal.

There is *Copperas* of *England*, of *Pisa*, *Germany*, *Cyprus*, *Hungary* and *Italy*; which only differ from each other in colour and perfection, being all the same mineral.

*White Copperas* is the *Copperas* of *Germany*, calcin'd, laid in water, then filtrated and reduc'd to salt; of which as it coagulates, they form cakes of forty or fifty pounds each. Such are those brought from *Goslar* in *Germany*.

The *Saxon Copperas*, before it is whiten'd, is of a bluish green, clear and transparent.

The *English Copperas* is of a fine green; that of *Cyprus* and *Hungary* of a sky blue, in pieces cut like the point of a diamond; that of *Pisa* and *Italy* is likewise green, and the last is as transparent as glass.

*Copperas* is of considerable use in many preparations; but especially in dying. The hatters also use it in their dye, and this and galls are the ingredients that compose writing ink.

The ordinary *English Copperas* is made of a kind of stones found on the sea shore in *Essex*, *Hampshire*, and so westward, ordinarily call'd *gold stones*, from the colour; they abound with much iron.



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To prepare the *Copperas* from them, they are laid in heaps or beds under ground. In process of time, they swell and ferment, and by degrees a humour distils out, which drawn into a cistern, and being afterwards boil'd, in the boiling shoots into those crystals we see it in.

CORAL is a production of the sea, which is reckoned in the class of marine plants.

Mr. *Kircher* supposes, that there are whole forests of it at the bottom of the sea; and Mr. *Tournefort* asserts, that it multiplies by seed, tho' neither its flower nor grain be known.

So then, if it be a plant, it has roots, by which it is fastened to the rock on which it grows; and these roots are covered with a bark, beset with starry pores, which traverse them from top to bottom.

Above these roots is the woody part (if we may so call a matter that resembles stones, rather than wood.)

It is divided into branches like other plants. The extremities of it are soft and rounded into little bowls, usually divided into six cells. These bowls are accounted a kind of pods, which contain the seed of the coral.

*M. le Comte de Marfigli* observes, it grows chiefly in grotto's, whose aperture or mouth opens to the south, and the vault or concave arch is nearly parallel to the surface of the earth.

As to its growth, 'tis necessary that the sea be as quiet and still as a pond; it vegetates contrary to almost all other plants, the foot of it adhering to the top of the grotto, and its branches extending downwards.

*M. de Marfigli* is of opinion, that its substance was originally fluid; and that which confirms the notion is, that the same substance does sometimes line the inside of a shell, which it could never enter, but in form of a fluid.

The antients were of opinion, that *Coral* was soft while it continued in the bottom of the water, and that it only became hard and solid by the impression of the air. But the moderns have by experience found to the contrary.

There are properly but three kinds of *Coral*, *red*, *white* and *black*; the white is the rarest, and most esteem'd; but the red is the most in use. It is procur'd by fishing.

It is to be chosen thick, smooth and shining, and of a beautiful red, not covered with any tartarous matter.

CORAL FISHERY. There are several places where this fishery is carried on, as the *Persian Gulf*, the *Red Sea*, the coasts of *Africa* towards the *Bastion of France*, the islands of *Majorca* and *Corfica*, and the coasts of *Provence* and *Catalonia*.

The method of fishing is pretty much the same in all places, with that us'd at the *Bastion of France*, where there is an established

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established fishery, under the direction of a company, and is as follows.

Each boat is mann'd with seven or eight men, commanded by the patron or proprietor; the cafter throws a machine (which performs the office of a casting net) that tears up the coral from the bottom of the sea; the other six manage the boat. This machine is compos'd of two beams ty'd a cross, with a leaden weight to press them down. To these beams is fastened a great quantity of hemp, loosely twisted round, among which they mix some strong nets.

The machine being thus furnish'd, is let down into the sea, and when the *Coral* is pretty strongly entangled in the hemp and the nets, it is drawn up by a rope, which is unwound, according to the depth, and which sometimes requires half a dozen boats crews to draw. If the cord happens to break, the fishermen are in great danger of being drowned.

Before the fishers go out, they agree on the price of the *Coral*, which is ordinarily at the rate of 4 s. 6 d. per pound.

The time of the *Coral* fishery is from *April* till *July*, which when it is over, and in a season usually amounts to twenty five quintals of *Coral* to each boat, this is divided into thirteen parts; of which the patron or master *coraller* has four, the cafter two, and each of the six companions one. The thirteenth being reserv'd for the company.

*To make artificial CORAL.* Take the horns of a goat, scrape or shave them, reduce them to powder, steep them in a strong lye made of the ashes of the wood of an ash, fifteen days together; then take it out of the lye, and mix it with cinnabar, dissolv'd in water; hang it over an easy fire till it grow thick, and then if it have the right colour of *Coral*, make it into what form or fashion you please, and polish it according to art.

*Another.* Take *Cinnabar* well beaten, and apply a layer thereof on a piece of wood well dry'd and polish'd, being first moistened with size; then polish it again, and for varnish rub it over with the white of an egg.

**CORRECTION** is represented in painting, &c. by an old crabbed woman sitting upon a bench with a whip in her left hand, and a pen in her right with which she is correcting a book.

Old and cross grained to shew that correction is a prudent act in him that gives it, and grievous to him that receives it, and therefore she has a rod in one hand, and a pen in the other; the book contains the cause of complaint and *Correction*.

**PADRE GIACOMO CORTESI** call'd **BORGOGNONE**, born in the year 1605, excell'd in battles, died in the year 1675.

## C O U

PIETRO *di* COSIMO, born in the year 1441, scholar of *Cosimo Roselli*, liv'd at *Florence*, excell'd in painting bacchanals and masquerades, died in the year 1521, aged eighty years.

COSMOGRAPHY is represented in painting, &c. by an ancient lady in a sky coloured starry vestment, under which is another of an earthy colour, standing betwixt two globes, the celestial on the right side, and the terrestrial on the left; holding an astrolabe in her right hand, in her left the *Roman* radius.

She is ancient because she derives her pedigree from the creation of the world. Her garments denote her participating both of heaven and earth, as do the globes, as being the instruments, with which she takes the distance and magnitude of several stars and the operations upon earth.

COSTUME, [in painting] as to observe the *Costume*, is to make every person and thing to sustain the proper character; and not only to observe the story, but the circumstances, the scene of action, the country or place, but to make the habits, arms, manners, proportions, and the like to correspond.



PETER COTTART, an engraver of vases us'd this mark.



JOHN COVAY, who engrav'd the works of Mr. *Vouet*, and others us'd this mark.

COUCH, in *painting*, is a term us'd for each lay or impression of colour, either in oil or water; wherewith the painter covers his canvass, wall, wainscot or other matter to be painted.

Thus they say, a painting has had its last *Couch* or lay; a ceiling has had two *couches*, there is a great deal of art in *couching* the colours well one after another.

The word is also us'd for a lay or impression on any thing to make it more firm and consistent, or to skreen it from the weather.

Thus paintings are cover'd with a *Couch* of varnish; a canvas to be painted, must first have two *couches* of size before the colours are laid.

Two or three *couches* of white-lead are laid on wood before the *Couch* of gold is apply'd.

The leather gilders lay a *Couch* of water and whites of eggs on the leather, before they apply the leaf gold or silver.

The *gold wire-drawers* also use the word *Couch*, for the gold or silver leaf, wherewith they cover the mass to be gilded or silvered; before they draw it through the iron, that is to give it its proper thickness.

The

## C O W

The gilders use the term *Couch* for the quantity of gold and silver leaves, apply'd on the metals in gilding or silvering. Each *Couch* of gold is but one leaf or two at most, and each of silver three, to gild.

If the gilding be hatch'd, there are requir'd from eight to twelve *Couches*, and only three or four, if it be without hatching.

To silver, there are requir'd from four to ten *couches*, according to the beauty of the work.

COUNTER-LIGHT, } a window or light opposite to any  
COUNTER-JOUR, } thing, which makes it appear to a disadvantage; a single *Counter-Light* is sufficient to take away all the beauty of a fine painting.

COUNTER-DRAWING in *painting*, &c. is the copying a design or painting by means of a fine linen cloth, an oil'd paper or other transparent matter; whereon the strokes appearing through, are follow'd and trac'd with a pencil, with or without colour.

Sometimes COUNTER-DRAWING is done on glass, and with frames or nets divided into squares with silk or with thread, and also by means of instruments invented for the purpose, as the *parallelogram*. Which see.

COUNTER-PROOF in rolling press printing, a print taken off from another fresh printed; which by being pass'd through the press gives the figure of the former, but inverted.

To COUNTER-PROOVE is also to pass a design in black lead, or red chalk through the press, after having moisten'd with a sponge, both that and the paper on which the *Counter-Proof* is to be taken.

COWSLIPS are of four or five colours.

1. Of a very pale *purple*. 2. Of *gridelin*. 3. Of *white* and *yellow*, &c.

1. To paint them in miniature, lay the *purple* on with *ultramarine*, *carmine* and *white*, observing to diminish the quantity of this last, when you are shading.

2. As for those of a *gridelin* colour, paint them with a light *lake*, a very little *ultramarine*, and a great deal of *white*; shade with the same, but let it be darker.

3. For the *white* sort, let it be *white* alone, and shade with *black* and *white* strokes.

The eye of these three *Cowslips* must be done with *masticote*, the form of a star, which is shaded with *gambooge*, and must in the midst of it have a small round of bladder green.

The *yellow Cowslip* must be *masticot*, shaded with *gambooge* and *umber*.

The buds, the leaves, and the stems must be *verditer* mix'd with  
O 3 a little

## C R A

a little *masticot*, and finish'd with *Iris* green ; with this same colour expressing ribs and veins on the leaves, heightening the lights of the largest with *masticot*.

**F**  
**ML** *Michael Coxis* his mark on certain *Arabian* stories in sixty eight plates, dated in different years, one is in 1576.

C. P. signifies *Cornelius Pulemburgh pinxit, John Bronchorts inc.*

**E** LUKE VAN CRANOGIO, or *Luke Van Craen*, painter to the Duke of *Savoy*. His mark is sometimes L. C. with a wing'd dragon, and the year 1509, at other times his mark is two little *Gothic* shields, or with the mark, or L. V. G. He engraved in wood and copper.

To make CRAYONS or PASTILS of which there are different methods. Some direct to take plaister of *Paris* or alabaster calcin'd, and of the colour of which you intend to make your *Crayons* a sufficient quantity ; to grind them first asunder, and then together, and with a little water to make them into paste ; then to roll them with your hand upon the grinding stone into long pieces like black lead pencils, and then to dry them moderately in the air ; which when they are to be us'd, are to be scrap'd or shav'd to a point like a common pencil.

Thus *Crayons* may be made of what colour you please, fitting them for the faces of *men, women, landscapes, clouds, sun-beams, buildings and shadows.*

*Another way.* Take tobacco-pipe clay, and temper it with a little water with what colour you please, making several according to the heights of colours you would make use of, which mix with the said tobacco-pipe clay, so much as the clay will bear, work all well together, form them into *Crayons*, and set them to dry for use.

*The manner of laying the ground Flesh-Colour for a face to be wrought upon with CRAYONS.* The best way, says Mr. Brown, is to colour the paper that you intend to draw on with a *carnation* or flesh-colour, near the complexion of the party you intend to draw after ; and to cover the whole paper with the same complexion, which is made of *cerufs, many* and a little *yellow-oker* ground with a little *gum arabick*.

When you prepare them make a good parcel of various complexions together, it being not worth while to make one at a time.

You are to lay on this ground colour with a wet sponge, but let the colour be so bound with *gum*, that it will not stir from the paper by rubbing with your finger on it.

When this ground is dry, then sketch or draw the first rough draught with coal, that being as you would have it, draw over the same lines again more perfectly with red-chalk, then with  
your

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your several *Crayons* you are to rub in your colours first, then with your fingers you are to sweeten and mix them together, scumbling them one into another after the manner of the oil painters.

And because many times the *Crayons* will not sharpen to so good a point as *black* or *red* chalk, you must be extremely careful to close and finish all your work at last with *red* and *black* chalk, which you may sharpen at your pleasure.

*Hans Holben*, painter to King *Henry VIII.* drew in *Crayons* the pictures of most of the *English* nobility both Lords and Ladies; and these were the patterns whereby he painted his pictures in oil.

There is another ordinary way of drawing in *Crayons* on blue paper, the ground colours are to be rubb'd in first with a pencil, and afterwards with a stubbed pencil or your finger.

And if you please you may work upon parchment exceeding neat and curious. In this manner, says our author, I have seen little pieces extremely well done by the hand of that great master *Hen. Goltzius* (the faces were about the bigness of a *Jacobus*) and also some done by the same hand in *Crayons*, which at a small distance you would have taken for *limning*.

Some he drew upon the rough side of *velum*, and some on the smooth side of parchment, being rubb'd in with small stubbed pencils, and finish'd with sharp pointed *red* or *black* chalk.

His *Crayons* were about the length of a finger, and about the thickness of a goose quill.

Mr. *Brown* says, he has observ'd, that **CRAYONS** or dry colours are wrought in several manners or ways.

The first is that of *Valyant*, whose manner was to place several heaps of colours in powder upon white paper, of several temperatures, according to the object he drew after, whether the life or painting.

His out-lines being first drawn, he made use of several rolls of white paper, roll'd up very hard and close, about the length of a pencil stick us'd in *limning*, and some of them about the thickness of the same, bigger or lesser according as his work requir'd with which he rubb'd in the several colours. And that his work is reasonably neat, and had a pretty good force.

And that some of the *French* masters have a manner, which differs but in two things from the former.

Instead of the rolls of paper they make use of stubbed pencils, some of which are stuff'd with cotton, and others with bombast, and instead of placing the colours on paper, they put them into small boxes.

But he rather esteems the way of drawing with a *Crayon* about the length of a finger, compos'd of several colours and mix-

tures,

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tures, ground together of a good consistence and stiffness, and roll'd up and dried.

That though they us'd formerly to temper them with milk, beer or ale, and some have anciently made use of stale size to bind the colours together, yet he approves not of any of these; for either they bind the colours so hard that you cannot draw at all with them, or else they are so brittle or loose that you cannot sharpen them to a point.

*Another way.* Grind your colours very fine upon a marble, sift them through a tiffany sieve; then take a piece of tobacco-pipe clay, and lay it on the grinding-stone, and temper it and your colours together with strong ale-wort.

Great care must be taken not to make them too wet, but of an even temper like moist clay, so that you may roll them up with your hand upon a stone.

Then lay them on a piece of paper, and set them to dry in an oven after the bread has been drawn out, or else you may dry them on a fire-shovel by degrees, till they are of a due hardness, which you may know by trying them on a piece of paper; and if they cast, they are not dry enough, and if so you must dry them longer, till they will not cast; then take a feather and some fallot oil, and oil them lightly over, and then lay them by to dry again; till they have thoroughly imbib'd the oil, which will render them excellent, and work free and easy.

Mr. Brown tells us, that he has taken yellow-oker burnt, and roll'd it up into a *Crayon*, and dried it with a moderate heat, and when it was thoroughly dry, he made it very warm, and then dipp'd it into linseed oil, and being thoroughly soak'd, he drew with it, and rubbing it with his finger, it would not rub out, nor any part of it stir, and he believes all the rest of the colours may be made to have the same quality; and adds, he doubts not but the *German* masters and others of the low *Dutch* had that art, he having by him drawings in *Crayons* of *Goltzius* and others, which were extremely neat, and would not rub out, being strong and like oil painting.

He recommends the following as the best manner of making *Crayons*.

First temper as many *Crayons* as there are varieties and changes of colourings in flesh, or faces, or draperies, or landscapes, &c. making them deeper or lighter as you please, as

If you were to make a *Crayon* for a brown glowing complexion, grind upon your stone *cerufs* and *vermilion*, *English* oker and a little *pink*, you need not be over curious to grind them extremely fine, but reasonably to bruise and mix them well together; to this add a proportionable quantity of *plaister* of *Paris* burnt, and finely sifted through a fine tiffany sieve; then mix that



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that and incorporate it with all the colours indifferently thick and stiff like moist clay ; and then take it from the stone and roll it up in a lump, out of which lump you may make your *Crayons*, by rolling with the palm of your hand upon the stone a small quantity of it, as much as will make a *Crayon* the length of a finger, and about the thickness of a goose quill ; then lay it in the sun to dry or the wind, but not by the fire.

In this manner, and with this mixture of *plaister of Paris*, with all the other colours and shadows in general, you will make them of a gentle quality and bind the colours together, and make them hold a sharpening to a fine point which otherwise would be too loose and brittle. The colour most difficult to work in this kind is *crimson*, if you make use of *lake*, which you may avoid and make use of *rosset*.

Another way to make a *crimson Crayon* to prevent it from being brittle or hard, you may temper it with a lighter mixture, which will make it more soft and gentle.

Be sure to mix *cerufs* with all the other colours and shadows whatever.

The temperatures for *greens* are made of *pink* and *bice*, and *mafticot* and *smalt*, and *mafticot* and *indigo*, with which colours you may make them lighter or deeper as you please, remembering that where you are to temper firm colours, as *umber*, *oker*, *indigo*, &c. you are to take the less *plaister of Paris* ; and where the colours are loose there bind them stronger and faster, by adding more *plaister of Paris*.

### *Of the making of CRAYONS for dry colouring.*

The use of *Crayons* for dry colours is so necessary in taking of views and prospects, and there are so few *Crayons* that are good of the sort, that I think the way of making them a necessary article to be known to every one, who is a lover of drawing and painting.

## WHITE.

As for *white* we have no occasion of any other, than that of *white* soft chalk, which should be saw'd into lengths of an inch and half or two inches, [There are little saws made on purpose for such uses about four inches long and very thin.] When you have sawed out your *Crayons* of chalk, which should be at most a quarter of an inch thick, round off the corners with a penknife, and point them by drawing your penknife upwards from the place where the point is to be. You ought to have a dozen or two of these to lie in a little case by themselves, or they will be discolour'd by the other colours.

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### YELLOW PASTILS, or CRAYONS.

*Yellows* come next, which should be divided into four or five degrees of colour.

*1st Yellow.* Take some grounds of starch and flower of brimstone, mix them well with a knife upon a polish'd marble, so that they produce the colour of straw, or a *Yellow* as will shew itself faintly; then pour a little milk to them, or a little pale ale-wort, till the colour become like a paste; then spread the paste on a smooth piece of chalk, with a broad knife till it is about the third part of an inch thick, and let it lye till 'tis half dry; then with a sharp knife cut it in lengths of an inch and a half, about the fourth part of an inch wide, and roll it thin between two little pieces of board, till they are round like a straw, and point them as I have directed for the chalk. If you please you may use ground chalk instead of grounds of starch.

*2d Yellow.* It is made of yellow oker, ground well with fair water, and then dried and beat. Mix this with ground chalk, in such quantity as it will be a little deeper than the former colour, and mix them up with pale ale-wort, in which a little white sugar-candy may be dissolv'd; and make these *Crayons* as the former.

*3d Yellow.* Grind yellow oker with water, with a stone and muller, and when 'tis dry, beat it very fine, and make it into *Pastils* or *Crayons*, with pale ale-wort, or size made with glover's leather, boil'd in water 'till it comes to a jelly; use it as before directed, and roll the *Pastils* between two boards.

*4th Yellow.* Take *English* pink, grind it as the former with water, and when 'tis dry beat it fine, and mix it with a very little ground chalk, till 'tis deeper than the former colour; then put to it some wort of pale ale, and stir all well together, and make it into *Pastils* or *Crayons*, by rolling in the foregoing manner.

*5th Yellow.* *English* pink is to be ground as the former, and to be made in *Pastils* or *Crayons*, by itself with pale ale-wort.

*6th Yellow.* *Dutch* pink is to be us'd as the former, and mixt with pale ale-wort, or milk, and to be roll'd and dried.

*7th Yellow.* Orpiment is one of the most poisonous colours that can be us'd; however it is one of the most beautiful sort, and is next to orange-colour. This must have a little ground chalk mixt with it, well temper'd together, and made up with pale ale-wort, with a little gum-dragon dissolv'd in it; and roll them up into *Pastils*, as you did the former.

### ORANGE-COLOURS.

*1st Orange-Colour.* Take yellow orpiment, mixt it with pale ale-wort, and when it is in paste, roll it, and make it into *Pastils* or *Crayons*.

*2d Orange-*

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2. *Orange-Colour.* Take orpiment and red-lead, (let the red-lead be very finely ground in water, and dried) then mix a little of this with your orpiment, till you have the colour you desire; and putting in it some ale-wort, wherein some gum dragon has been dissolv'd, make into a paste, and roll it into *Pastils* or *Crayons*.

3d. *Orange-Colour.* Take *English* pink, grind it well, and put to it as much vermilion as will make it of the colour you desire; mix these up with ale-wort, that has been boil'd till 'tis more glutinous than ordinary, and make it into *Pastils* or *Crayons* as before.

4th *Orange-Colour.* Take *English* pink finely ground, and put to it as much red-lead, well ground, as will make it agreeable to your design, mix these well with ale-wort boil'd to a thickness, and make them into *Crayons*.

5th *Orange-Colour.* Take some *Dutch* pink, well ground, and mix it with some red-lead finely powdered, to the colour you want; then with ale-wort or milk make it into a paste, and make it into *Pastils* as before.

*Note,* In the mixture of these colours, observe, that they have as many different shades as possible.

### REDS.

1st *Red.* Take red-lead, grind it well with water, then dry it and beat it to a fine powder, and put to it some chalk or white-lead finely ground to brighten it; mix this with ale-wort, wherein a little gum-dragon has been boil'd, make it into a paste, and roll it into *Crayons*. Of this your *Pastils* should be made some deeper, others paler.

2d *Red.* Take red-lead, and grind it well with a marble and muller, make it into a paste with ale-wort, in which gum-dragon has been boil'd.

3d *Red.* Red-oker wants no preparation, but sawing as directed for chalk, in the first article.

4th *Red.* Take vermilion, ground fine, and mix it with some fine chalk, or white-lead, well pulveriz'd; divide the composition into three parts, and by adding more of the white to one than another, you may make three different colours; then put ale-wort boil'd thick to each, and make them severally into paste, and then into *Pastils*.

5th *Red.* Take vermilion, grind it well, and mix it with ale-wort, that has been boil'd to a thickness with gum-dragon, till it is a paste, then roll it into *Crayons* or *Pastils*.

6th *Red.* Take some good lake, well ground with water upon a marble, and when 'tis well dried and powdered, divide it into three parcels, and mix with each as much chalk or white-lead ground fine, as will make them of different colours,  
work

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work them severally into paste; then roll them into *Pastils* or *Crayons*.

*7th Red.* Take fine lake, and reduce it to as fine a powder as you can with water, and when 'tis dry, and again finely powdered, mix it with ale-wort, and make it into a paste, and roll it into *Crayons*.

*8th Red.* Take *Indian* red well ground with water, and dry it like the other colours; then mix it with ale-wort that has been boil'd to a thickness with gum-dragon. This alone will be a very strong colour; but to make it of different shades, you must mix it with white, each parcel so as to be shades to one another; then make 'em severally into *Pastils*.

*9th Red.* Take rose-pink, and cut it into the shape of *Crayons*, without any preparation. Carmine is too dear for them; for twelve penny-worth would make but a small *Crayon*.

### PURPLES.

*1st Purple.* Take rose-pink finely ground and powdered, mix it well with a little *Sanders* blue, till the powder appears of the colour you desire; then make it into a paste with ale-wort, thickned with gum-dragon, and roll it into *Crayons*.

*2d Purple.* Take lake finely ground and wash'd, add to it as much blue bice as you think convenient to make it of a reddish purple, and you should vary this in two or three manners, each lighter than the other; in the lighter sorts, put a sufficient quantity of chalk or white-lead ground fine, and mix them up with ale-wort boil'd to a thickness with gum-dragon; then roll them into pastils.

*3d Purple.* Take some lake well ground, and to it add as much *Prussian* blue as will make it of the colour you intend; mix those well together in different parcels, making some more inclining to red than the others; and to make the faintest purple of them, add some chalk ground at your discretion, and make 'em severally into paste with ale-wort thickned by boiling; then into *Pastils* as before directed.

### BLUES.

*1st Blue.* Blue bice is the lightest blue colour used, and must be well ground with fair water on a fine marble, and when it is dry, reduce it again to a powder; then lay it in four parcels, and put to three of them, in different proportions, some chalk or white-lead ground, so that, when mixt, each may be lighter than the other; mix these separately with ale-wort, thickened with scraps of golver's leather; and when they are made in a paste to your mind, make them into pastils, and the fourth part of the blue bice must be made up by it self in the same manner.

*2d Blue.*

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*2d Blue.* Take verditer well ground on a fine marble, lay it in four parcels, and mix one of them purely with a thin size, made of white glovers shreds and ale-wort; and the other three parts mix with several proportions of chalk or white-lead well ground, so as to make shades to one another; make these into paste with ale-wort, thickned with gum-dragon, and then into *Crayons*.

*3d Blue.* Take some *Prussian* blue well ground, and lay it in four parcels on your marble, and with three of them mix some chalk or white-lead well ground to make them of different degrees of colour, and the fourth must be alone. Make the three mixt colours into paste with pale ale-wort boil'd till it thickens; and the plain colour must be made into a paste with some ale-wort boil'd, and thicken'd with white shavings of leather from the glovers. Make all these into *Pastils*.

*4th Blue.* Take rock indigo well ground with water on a marble, dry it and powder it again; then divide it into parcels as before, and with two or three parts of them, mix different proportions of ground-chalk or white-lead ground, to make them deeper or paler; and one part must be the simple colour. Put to the mixt colours some ale-wort thickened with boiling, and mix them to pastes; then make them into *pastils*.

As for the plain indigo, mix it with ale-wort thickened by boiling with glover's shreds of white leather, then make it into *Crayons*.

## BLACKS.

*1st Black.* The black that is commonly used as a *Crayon*, is charcoal cut into lengths; the softest and best is that made of willow. Have at least a dozen or two of these, for black and white are a great deal more used than any other colour.

*2d Black.* Take ivory black ground very fine with common water, add to it a very little ground indigo; for a bluish cast will enliven the black, and help that deadness, which a plain black always carries with it.

## BROWNS.

*1st Brown.* Take for a light brown some fuller's earth, grind it well with water, and mix with it some ground chalk or white lead, to make it in different colours, that is lighter or darker, as you think proper; mix this up with pale ale-wort boil'd thick, and have at least four sorts of it.

*2d Brown.* Take some *Spanish* brown ground very well, and mix with it some fuller's-earth, to make it lighter, for the *Spanish* brown is a dark colour of itself; and when you have made this mixture, you may put to some part of it a little chalk or white-lead ground in different proportions, to have them of different shades: These are for the lighter browns, and mix them

them severally in pastes with a light size of fish glue, or isinglass and water, and some of them with pale ale-wort boil'd thin, or thick water-gruel boil'd with gum-dragon; then make them into *Crayons*.

*3d Brown.* Take *Spanish* brown ground fine, and some *Indian* red; mix them well together, and to them put some pale ale-wort, till they become a paste. You may make some of them lighter with chalk, or white-lead ground; then roll them into *Pastils*.

### GREENS.

*1st Green.* Take some verdegrease, and boil it in sharp vinegar, and when it boils, add a little tartar powdered, which will so dissolve the verdegrease, that the liquor will be of a fine colour; then set the liquor in little gallipots expos'd to the air, which will dry the colour, and then it will dissolve in common water. This may be taken with as much warm ale-wort as will cover it, and will dissolve the green; then make it into *Pastils*, with ground white chalk, as much as you think fit.

*2d Green.* Take distill'd verdegrease ground with vinegar on a marble, wash it well with water; the manner of which is, to throw the verdegrease into water, and in half a minute to pour off the water into a cup, and let it settle; then pour the water from it, and wash it again in the same way; and when this is dry, make it into *Pastils* with ale-wort.

*3d Green.* Take verdegrease prepar'd as before, finely powdered, and mix it with a little *Prussian* blue in several proportions. In the lightest sorts, put a little white, or the brightest yellow well ground, to make varieties of colour; mix all these with pale ale-wort boil'd to a thickness.

*4th Green.* Take *Indigo* well ground, and some *English* pink; mix these well together upon a marble, and when they are well powdered, make them into a paste, and roll them up with a soft size and oil into the shape of crayons, or with pale ale-wort or thick water-gruel; but when you use water-gruel, it must be strain'd and boil'd with some gum-dragon.

*5th Green.* Take blue bice ground fine, add to it some *Dutch* pink well ground; mix them in parcels, and prepare them in shades to one another; then make them into pastes, and roll them into *Pastils*. You may have five or six sorts of these.

*Note,* The liquid you use to make them into *Pastils*, must be ale-wort boil'd a little thick.

*6th Green.* Take rock indigo ground very fine with water on a marble, and when 'tis dry, beat it fine again; then divide it into parcels on the marble, and to some of them put a little flower of brimstone in greater or lesser quantities; to others flower of brimstone and *Dutch* pink mixt, so that you may have variety

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variety of colours. When you have thus made the different shades you intend, then make them into pastes with ale-wort thickened by boiling with white glover's shreds of leather, or a little gum-dragon; and roll them into *Crayons*.

*7th Green.* Grind rock indigo with water, and put to it in several parcels, as much *Dutch* pink as you think fit, to make your greens of various shades; when these are well mixt, put to them some ale-wort thickened by boiling, with which make them into pastes; then roll them into *Pastils*.

*Note,* The reason why these *Pastils* are better than those in common which are bought at shops, is because they are generally made too stiff with gums, and so will hardly touch the paper; and all these will work freely, and express the several colours you desire.

The reason why you are to make five or six shades of each colour is, because we cannot mix any when we use them; whereas in oil-painting, and painting in water-colours, we can make what mixtures we please in an instant: And when we are about any painting or drawing in *Crayons*, which happens to have a great variety of colours in it, we ought to have every sort of colour that can be thought on.

*Note,* These colours should be kept in a box partition'd, every sort by it self, *viz.*

*The White.*

*Yellows.* Lay the brightest sorts in one, and the deeper sorts in another, till you come to the orange-colours.

*Orange-Colours.* The lighter sorts in one apartment, and the deeper in another.

*Reds.* The paler sorts, or flesh colours, in one apartment, the brighter reds in another, the stronger reds in another, and the deepest reds in another; every one with its proper shades, till we come towards purple.

*Purples.* The paler sorts inclining to red in one apartment; the next sorts, more inclining to blue, in another, with their shades; and those which are next to blue with their shades, in a part by themselves.

*Blues* should follow the purples; put the lightest in the first apartment, the next degree into another, a third into another, and the fourth to the last into others: But the *Prussian* blue keep quite by itself, and its mixtures by themselves; it serves very well in this way to supply the place of ultramarine, and it is much cheaper, for a *Crayon* made of ultramarine would cost not less than half a guinea. And besides in this way of *Crayon*-drawing, the preparation of *Prussian* blue does very well answer the same end, though that colour will not do in water-colours, nor even last in oil-colours, if it comes to be exposed to the weather,



weather, for in either case it changes to a dirty yellow-colour ; but I find the *Crayons* hold, by being imbodied as I have directed.

*Greens* should be divided into three or four forts, and, with their shades, be laid in several apartments.

*Browns* should also be put in three or four parcels, with their proper shades, to be laid in each apartment of one great box. And you should never be without *Crayons* of charcoal in another case.

With all these you will be compleately furnished ; and when you go out to take any view, have one of every fort in a little box, divided as the foregoing, to carry in your pocket.

The Paper which you should use on this occasion, should be *Venice* rough paper, almost like our whited brown paper, or even the whited brown paper sold at every chandler's shop ; the stiffer it is, the better ; that which they call cap-paper is the best, as you will find by experience, for upon such the colours easily distribute themselves. And by this means you may take figures in their proper colours as you see them, for you may match the colours as they appear with the *Crayons* you have by you ; and, as the *Crayons* are dry, they will not alter their colour, whereas the wetted colours will appear deeper when they are wet, than when they are dry, which will deceive the eye of a young beginner.

#### *Instructions for the use of* CRAYONS.

Remember when you use these *Crayons*, that you point them from the bottom upwards, and make not the points too sharp, except in the white chalk, the red oker, and the charcoal.

You may make a pretty drawing on blue paper, with only chalk and charcoal ; the strong lights and the dark shades make a fine contrast, and a pleasant appearance in a drawing.

CREDIT is represented in painting, &c. by one at man's estate, nobly clothed, having a gold chain about his neck, with a merchant's book of accounts indorsed on the cover, *Solutus omni fœnore*, free from all interest, and a griffin below.

His age shews that he may have credit, as does his senator's gown ; the gold chain seems to command credit ; the motto signifies true credit ; the griffin was in great credit amongst the antients, and used for a symbol of safe custody, and therefore intimates, that a person should have a watchful eye over his stock, if he means to get credit.

*To dye cloth, stuff, &c. a brasile* CRIMSON. First dye it as you do flesh colour, but it must be deepened, then pour into the copper fresh spring water, adding lye of pot-ashes, and lye made with calcin'd *tartar* ; stir them well together, and let the cloth soak in it two hours, stirring it about every quarter of an hour,

hour, and it will be of a very good *Crimson*; but if the cloth doth not take the dye kindly you must add more of the lye.

*To dye a very good CRIMSON.* Allow half an ounce of *cochineal* to every pound of wool, half a quartern of *oatmeal* or *wheaten-bran*, having first dissolv'd it eight days in water, that it may become sour, and when you go about dying, pour the bran-water into the kettle, and then (the *cochineal* having been dissolv'd the night before in warm water) make a good fire under the kettle to heat the liquor, and put it into it by little and little, till there is no more of the solution left, stirring it about all the while; and when it begins to boil, add a proportional quantity of lye, and pass the cloth through it three times; or throw half a quartern of wine lees or ashes into the warm suds, and pass the goods through it till they have taken the dye sufficiently.

*Another CRIMSON.* Let the stuffs be allum'd as usual, and having heated a sufficient quantity of fair water, and for every pound of stuff or wool, take of *cochineal* and *tartar*, each an ounce and half, the former being, as before, first sufficiently dissolv'd, boil these together; put in the goods that you would dye, and keep stirring them about for an hour and a half, then cool and rinse them out.

*An extraordinary good CRIMSON.* Take two ounces of fine white wine *tartar*, beaten very fine, and two ounces of the best alum for every pound of woollen ware, and also half a pail full of clean rain water for each pound, boil them together with the ware for an hour, stir it about and then hang it out; let it dry and rinse it very well in clean water.

Then heat clean rain water in a copper, take out a pailful, and put into it one ounce of *cochineal*, pounded to an impalpable powder, dissolve it a little and pour it into the kettle again, taking care to rinse the *cochineal* very well out of the pail; then having reduc'd one ounce and a half of *tartar*, and a dram of *red arsenick* also into powder, stir them well together and put them into the copper; then put in the stuffs after them, and a quarter of an hour after, add two ladles full of *wheaten-bran*, keeping stirring them continually; boil them for a quarter of an hour; then take out the stuffs and rinse them.

But you must take notice, that when you put in bran, you must also put in a spoonful of burnt wine lees, which will give the stuffs an extraordinary lustre.

*A purple CRIMSON.* First dye the ware a light blue, still remembering that the lighter the blue is, the finer the purple will be.

Then with an ounce and half of *cochineal*, and an ounce and half of *tartar*, work it as other *Crimson*, and it will be a

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very beautiful colour; and the lustre will become remarkably brighter and clearer by adding a little bran-dye.

*A lavender* CRIMSON. Having first dyed the stuff of a tawny faint blue, rinse it clean, and throw the suds into the purple suds, after they have been us'd in dying.

These suds being of very little value, and otherwise useless, produce a good lavender dye at a cheap rate. See LAVENDER.

For a CRIMSON colour in painting use *carmine*, but it is necessary that the buyer be inform'd, that there are several sorts of it, some darker and some much coarser than others, and therefore it should never be bought by candle light, unless of such in whom one can confide; for between the best and the worst there is ten shillings an ounce difference; nay, indeed all the money an ounce will cost, because that which is bad will spoil the work.

*Of a transparent* CRIMSON. A liquid colour not much inferior to carmine itself, may be made of the raspings of brasile wood, sold at the dry-salters, and at some colour shops.

To make this transparent *Crimson* colour, boil an ounce of the raspings of brasile wood in twelve ounces of pale stale beer and a little allum, till the colour of the liquor is as strong as you please; which you may discover by dipping into it a slip of white paper, and when this colour is as you would have it, and 'tis cold, pass it through a linen cloth, and put the clear liquor into a bottle for use.

And if you have a mind to bring this colour to a body, take ox blood and dry it, till it can be reduc'd to a powder, which being mixt with it will give a colour, which will not be much inferior to a middling sort of *carmine*. Some say, that the blood of an ox or cow dry'd, will make a good body for any colour.

*A CRIMSON colour from Mr. Boyle.* Take the fruit of the berry bearing *spinach*, which every gardiner about *London* knows, press them, and you will have a beautiful red-colour'd juice from them; boil this and put about a fourth part of allum to it, when you pour it into the vessel where it is to cool, and it will make as fine a colour as any others that are noted, and for a small expence; for it will grow any where, and in one bunch of the fruit, there are seeds enough to sow two or three roods of ground.

The red *beet-root* bak'd with a little strong vinegar produces an elegant red colour, equal to a tincture of carmine, then pour it on allum, and it is fit for use, where carmine should be us'd in washing of prints: For it is a fine transparent red.

*A CRIMSON colour for washing prints, &c.* Put thirty or forty grains of cochineal bruised into a gally-pot, and as many drops of *tartar-lye* [see it under the articles *tartar* or *lye*] as will  
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just wet it, and make it give forth its colour; and immediately add to it half a spoonful of water, or more if the colour be yet too deep, and you will have a delicate purple liquor or tincture.

Then take a bit of allum, and with a knife scrape very finely a very little of it into the tincture, and this will take away the *purple* colour, and make it a delicate *Crimson*.

Strain this through a fine cloth into a clean gally-pot, and use it as soon as you can, for this is a colour that always looks most noble, when soon made use of, but will decay if it stand long.

*To dye a common or slight CRIMSON.* For one pound of woollen, take 2 ounces of *allum*, 2 ounces of *white wine tartar*, one ounce of *aqua fortis* temper'd with half an ounce of *English tin*, a pound of *madder*, a quarter of a pound of *blue wood*. Boil the stuffs well in this liquor, then let them cool and rinse them out.

*To finish the dye.* Put into the liquor a quarter of a pound of *blue wood*, three ounces of *pot-ashes*, and stir the stuffs very briskly in it. This dye looks very well and may serve for slight stuffs, and such as are design'd for linings, and that are kept from sweat, wet and weather; but it quickly fades.

*To dye a very fine CRIMSON.* For sixteen pound of woollen stuffs, boil twelve gallons of water or rather more, to which put in sixteen handfuls of wheaten-bran; let it stand a night to settle, stirring it very well, and in the morning pour off the clear liquor or rather strain it, that it may be perfectly clear.

Mix one half of this liquor with as much clean water, that the stuffs or wool may be work'd commodiously in it.

Boil this mixt liquor and put into it one pound of *allum*, and half a pound of *tartar*; first boil these very well, and then put in the goods, and boil them for two hours, keeping them stirring (especially if they be wool) from top to bottom continually.

*To finish it.* Boil the remainder of the bran and water, with an equal quantity or rather more fair water, and when it boils apace, put in four ounces of *cochineal*, and two ounces of pure *white wine tartar* powder'd; stirring it about, and taking care that it neither runs over or boils too fast, and when it is very well boil'd, put in your ware, and stir it about till you find that it has taken the dye equally every where, then cool and rinse it out.

*To dye a natural or lively CRIMSON.* First wet the goods well, and for every pound of stuff to make the suds, use two ounces and a half of temper'd *aqua fortis*, and three ounces and half of *tartar*, an ounce and a half of *cochineal*, and eight ounces of *allum*; boil the ware with all these for half an hour, let them cool and rinse them out.

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*To finish the dye.* Boil four ounces of *cochineal*, three ounces of starch, three ounces of *white wine tartar*, and half an ounce of white *arsenick* together for a quarter of an hour; then put in the goods, and let them boil for above half an hour, or till they have taken the dye well and equally.

*To dye SILK of a CRIMSON.* The silk having been prepar'd as before directed, allow an ounce and half of *cochineal* to every pound of silk, pound it to powder, and pass it through a hair sieve, then put it into the remaining pail of liquor last mentioned, hang it over the fire again; then with the liquor put it into a brass kettle, and cover it very close that no dust may get in, and hang it over the fire again, and add to it an ounce and a half of white *arsenick*, and two ounces and a half of tartar, both reduc'd to a fine powder; boil them together for a quarter of an hour; then take it off the fire, and let it stand a very little while, and then put in the silk, stirring it about very well, that the colour may not be variegated when the liquor is cold; then wring out the silk, and if it is not ting'd enough, hang the dye over the fire again, and after the *silk* has been beaten, put it in again as before.

When the *silk* is dyed, you must in the first place rinse it out in hot suds, made by putting half a pound of *Venice soap*, in proportion to every pound of silk, let it be dissolv'd in it, and afterwards put the silk into cold river water; then beat it upon a block and hang it to dry, then spread it abroad, wound and manag'd according to custom, it will be a very beautiful *Crimson*.

If you would dye *Crimson* from a violet ground, you may always abate one third part of the quantity of the ingredients; that is a pound of silk so grounded will not require above an ounce of *cochineal*, as much of *arsenick*, and two ounces of tartar.

*Another cochineal CRIMSON dye.* When the silk has been well boil'd and prepar'd as before directed, take half a pound of crude allum to every pound of raw *silk*, and when it is dissolv'd, put the silk into the liquor, and let it steep for the space of a night; the next morning rinse it out very well; and then dye it as follows.

Into a kettle of fair water put in two ounces and a half of *cochineal* finely powdered for every pound of silk, and three ounces of pounded galls, and three ounces of purified gum, one eighth part of an ounce of *turmeric*, and in this liquor boil the silk for two hours; after which, let it remain in it a whole night, and the next morning rinse it and dry it.

*To dye SILK a dove CRIMSON.* The silk having been allumed, (as above directed) clean rinsed, and hung upon poles, take a kettle, scour it very clean, fill it with water, and to each pound of silk, put an ounce of *cochineal*, stir the silk in the liquor, and boil them for an hour, then rinse the silk out, wring it and dry it.

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You must take special care that the silk is not party-colour'd or of different colours, by taking the colours better in one place than in another; and for that reason, it must be put in when the liquor is no more than lukewarm.

*A slighter sort of dove* CRIMSON. To every pound of silk take four ounces of *brasile*, boil and strain it as before, then pour cold water to it, till it becomes just lukewarm, then stir the silk in it, till it has extracted the strength out of the dye or liquor, which you may then throw away; and again, put *French* water, and then a little pot-ashes to it, thus let it dissolve, stir the silk in it, rinse and dry it.

*To dye a* CRIMSON *with* ORSEILLE. Fill a clean kettle with fair water, and allow three quarters of a pound of *Orseille* to every pound of silk, stir the silk about in it and wring it out; then add a quarter of a pound of *allum*, and a handful of white *arsenick* to every pound of silk.

Let the silk lie in this liquor a whole night, the next morning wring it out carefully and dry it, afterwards take two ounces of *cochineal*, two ounces of galls, and two ounces of *gums*, and a little *turmerick* to every pound of silk; put in the silk and boil it for two hours; then put in a little *Zepsie*, let the silk lie in it all night, and the next morning rinse it and dry it according to art.

*To dye Silk a* CRIMSON *Musk colour*. Fill a clean kettle half full of water, and for every pound of silk, take a quarter of a pound of *yellow wood*; tie it up in a bag, put it into the kettle, and boil it very well; add to every pound of silk one ounce of *blue wood*, and boil them together; then put in one pound of galls, and fill up the kettle with stale gall water; then put in the silk, being first allumed and cleansed; stir it about very well, and let it lie in the dye all night, the next morning wring it out, rinse it and beat it, and then rinse it again in warm water and *scheiet*; and when you find the dye deep enough, cool it, wring it out, rinse it, beat it and hang it up to dry.

*To dye* SILK *an* ORANGE CRIMSON. Put clean rain water into a very clean kettle, then put four ounces of pot-ashes, and four ounces of *orleans*, strain them through a sieve into the kettle, and dissolve them very well, then the boil'd and allumed silk (being first well rins'd from the allum) must be stirr'd about in it and boil'd, then wrung out and rins'd and beaten; then to every pound of silk, take twelve ounces of galls, which boil two hours, and then let them cool for two hours, and afterwards lay the silk to soak in it for three or four hours; after which take it out, wring, rinse, beat and dry it.

*To dye* SILK *an* *Isabella* CRIMSON. Prepare the silk, rinse and beat it very well, then stir it about in the same liquor in



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which the orange colour is dyed, and so you will have a fine *Isabella Crimson*.

Then rinse, wring and beat it well, and lay it in the gall suds, which the *orange* has before been in for three or four hours; and afterwards rinse and dry it very well.

If you have no *orange suds*, take for every pound of silk one ounce of *orleans*, half an ounce of pot-ashes, and dye it therein like the *orange*, then gall it, rinse and dry it.

The **CROCUS Flower** is of two colours, the *yellow* and the *blue* or *purple*.

For the *yellow Crocus* [in miniature] take *masticote* and *gall-stone*, shaded with *gambooge* and *gall-stone*, expressing three lines or rays on the outside of the leaf, separate from, and parallel to each other, with *bistre* and pure *lake*, which must be scumbled into the strokes of the ground or leaf; and the insides of the leaves must be all *yellow*.

For the *purple Crocus*, lay on *carmine*, mix'd with a little *ultramarine* and *white*, expressing deep purple stripes on some of the leaves, as you did for the *yellow*, and on others only fine veins.

The seed of both sorts is *yellow*, and must be done with *orpiment* and *gall-stone*; for the stalk, lay on *white*, and shade with *black*, mix'd with a little *green*.

The green of this flower is a pale *verditer*, shaded with bladder *green*.

**CROCUS MARTIS** } for colouring of glass. Of this there

**CROCUS FERRI** } are several ways of preparing, some more simple, and others more extraordinary and curious, both with and without liquors or *menstruums*; the effects of which are different both in tinging of glass and other uses to which it is put.

**CROCUS MARTIS**, made without *menstruums*, depends on a very fine calcination of the *iron*, by means of which, the tincture that is extracted gives a very fine red to glass, and so communicates it self to it, that it not only manifests it self, but makes all other metalline colours (which ordinarily are hidden and dead in glass) appear fair and resplendent.

As to the way of *menstruums*, it may be said, that all acid and corrosive juices which operate on *copper*, will also do the same on *iron*; so that you will always have a red colour, more or less bright, and which may be mixt with tinctures of other metals to make other different colours.

The first way of making *Crocus Martis* is as follows. Take very fine filings of iron, or those of steel which are better, mix them in a crucible, with three parts of powdered brimstone, laid layer upon layer; calcine them for four hours by a very strong



strong fire, till the sulphur is consum'd ; then take the crucible out of the fire, and let the matter cool ; then grind it to a very fine powder, and searce it through a very fine sieve ; then put that powder into a crucible, and lute it well, and set it into the mouth of a reverberatory furnace for the space of fifteen days or more ; and of the reddish colour it was before, it will become a very deep red, almost like a purple. Keep it in a very close vessel for the use of glass colours ; it will work many wonderful effects.

*Another way of making CROCUS MARTIS for colouring of glass.* Though this way of making *Crocus Martis* be very easy, yet it deserves to be esteem'd, since it tinges glass of the true blood red colour. It is prepar'd as follows.

Take filings of *iron*, or (which is better) *steel*, put them into earthen pans with strong vinegar ; mix them well, but only sprinkling them so much, that they may be thoroughly wet ; spread them abroad in the pans, and set them in the sun to dry, or if the sun be obscur'd by clouds, set them in the open air ; then powder them, and sprinkle them again with vinegar, and dry them again as before ; then powder them again, repeating this operation eight times ; at the last, grind and searce them well, and you will have a very fine powder of the colour of beaten brick, which keep in close vessels for use.

This *Crocus Martis* thus made with vinegar, complies very much with *greens* and the *emerald* colour of glass of lead. It is us'd also in pastes for the same colour with *verdegrease*, and in blacks.

*Another CROCUS MARTIS with aqua fortis.* Put fine filings of *iron* or *steel* into well glaz'd earthen pans, sprinkle them with *aqua fortis*, and set them to dry in the sun, and then reduce them again into powder, and repeat this process several times, as in that made with vinegar ; and when it has obtain'd a good red colour as before, powder it, searce, and keep it in a glass vessel close stopp'd for use.

By this the red colour of iron is made more manifest in glass, and is so very resplendent and bright, that it seems almost incredible, but that experience has shewn it.

*A CROCUS MARTIS with aqua regalis.* Dissolve filings of *iron* or *steel* in a glass body well covered in *aqua regalis*, that is, in *aqua fortis* made *aqua regalis* with *sal armoniac*. See *aqua regalis*.

Keep them so for three days, stirring them every day well, during which you may add fresh filings by little and little ; in doing which you must be very cautious, for it riseth so much by fermentation in the *aqua regalis*, that it will endanger the breaking the glass or running over.

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After three days, set the cucurbit on a gentle fire, that all the water may evaporate, till it leaves the *Crocus* behind dry, and it will be admirable for tinging glass, and perhaps the best of all; because in the former you cannot find such diversities of colours as in this.

*Another method of making CROCUS MARTIS.* Though this is an easy method, it will make a *Crocus* of no less beauty and vertue than the former.

Take filings of *iron* or *steel* without any rust, let them stand in a reverberatory furnace with a very strong fire; the heat being at least to the fourth degree, till it becomes of the colour of purple.

Then take it out of the fire, and let it stand by to cool, and then put it into a vessel full of water, and stir it briskly about, and then presently pour off the water into another vessel, which you may also repeat.

Thus there will remain in the first vessel the iron that is not calcin'd, which, if you please, you may put again into a reverberatory furnace.

In the second vessel there will be the *Crocus*, which set over a gentle fire to evaporate the water.

But you must not decant off the water, tho' it does appear clear, after it has settled to the bottom; yet the water contains the most subtle parts of it imperceptibly suspended in it.

Having well evaporated the water, you will have a very red powder, very fine and extraordinary, which keep for use.

*Another way of making CROCUS MARTIS.* This last way will be of some use to those who shall desire to have the iron or steel granulated, or in little drops, the metal whereof is difficult to melt.

Take a bar of either of the metals of five or six pounds weight, heat it as hot as is possible in a smith's forge, so that it may sparkle when it comes out of the fire.

At the same time some other person must have a long stick of brimstone ready, and large too, which will be best for this operation, which immediately upon the metals coming out of the fire, they must be thrust one against the other over a great earthen pan full of warm water, into which the metal will drop in small drops or *granuli*, melting like wax when touch'd by the sulphur.

When this has been done, lay them layer by layer in a crucible with powdered brimstone, and then set them in a reverberatory fire, where they will be reduc'd to a red powder, which grind and searce and keep for use.

*The method of making CROCUS VENERIS.* Take as much *ÆS USTUM* as you please, add to it its weight of green verdegrease,

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verdegrease, and as much *sal armoniac* fix'd and fusil; pound the whole well together, and dry them over the fire in a large iron shovel; then into the shovel pour lee of urine, and make the whole boil till the lee be intirely consum'd; then put on more of the same lee, boil it again till the lee be consum'd as before, and repeat this a third time.

Then pound or grind this mixture, and put it into a reverberatory that it may calcine well; then pound it again till 'tis reduc'd to an impalpable powder, and put it into an earthen glaz'd pot; pour upon the same lee of urine, wherein you dissolve it, *viz.* to each pound of lee put four ounces of *sal armoniac* fix'd and fusile.

Then boil the whole over a gentle fire in ashes for the space of a quarter of an hour; then decant off that lee into some proper vessel, for that will contain the tincture of the *æs ustum*, and of the green, which it has extracted.

Then put more lee upon the matter, and boil it a quarter of an hour more over the same fire; then decant off that lee to the former: continue thus to water it with fresh lee, and decant it off to the former, as long as it will extract any lee from the matter.

Then take all these tinctured lees, and filter them through whited brown paper; then evaporate three quarters over a gentle fire.

Put the remainder into an alembick, with the helm (or head) on, and the receiver, and distil it till it be dry; then will you find at the bottom of the *alembick*, a *Crocus Veneris* of a very wonderful virtue for colouring glafs, &c.

*Another easier way of making CROCUS VENERIS.* Take very thin plates of copper, put them into an earthen pot with common salt, layer upon layer; put this pot on the furnace, where let it stand till the matter be very red; then put the plates with the salt into cold water, and wash them well to take away all blackness.

Repeat the laying of these plates with common salt, calcining them at the fire, and washing them as before, as often as you please. After the last time, pour warm water on that, wherein the plates have been extinguish'd, and let it stand for some time; then empty it, and you will find at the bottom of the vessel a *Crocus Veneris* as red as blood. Wash it well several times to cleanse it, and dry it well with a linen cloth, and keep it for use for colouring glafs.

There are some who content themselves with taking *æs ustum*, prepared with *sulphur* and common salt, heating it red hot in the fire nine times, and quenching it as often in linseed oil; and then dry it and powder it.

*Another*

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*Another easy way of making* CROCUS VENERIS. Take of copper simply calcin'd (see COPPER *to calcine*) one part, of *sulphur vivium* eight parts; powder them well, and mix them together in a large crucible; set it into a coal fire in a little furnace, stirring the matter continually with an iron rod, till the sulphur be consum'd; repeat this operation five or six times, then cast it thus refin'd into an iron pan of boiling water; stir it often with a stick, while the calx descends to the bottom; then the water being settled and clear, evaporate it to three fourths, to extract the crystals; or rather evaporate the whole, and you will find at the bottom of the vessel a *Crocus Veneris* very fine and red.

Mr. CROSS was a famous copier in the reigns of King *Charles I.* and *Charles II.* A story goes of him, that being employed by King *Charles I.* to copy several pieces in *Italy*, and having leave of the State of *Venice* to copy the famed *Madona* of *Raphael* that was in *St. Mark's Church*, he performed the task so admirably well, that he is said to have put a trick upon the *Italians*, by leaving his picture there instead of the original; which last he brought away with that celerity and caution, that, tho' several messengers were sent after him, he had got so much the start of them, that he carried the piece dexterously off. Afterwards, in *Oliver's* days, the then *Spanish* Embassador here, *Don Alonso de Cardenes* bought this picture when the King's goods were expos'd to sale, together with the *XII Cæsars* of *Titian*, and King *Charles* on the *dun horse* by *Van Dyck*; of which last there is a good copy by *Sir Peter Lely* in the *Middle-Temple* hall; all which (some say) remain in the *Escorial* to this day, though others affirm the picture of King *Charles* on the *dun horse*, is now in possession of the Duke of *Bavaria*, who bought it of one *Mynheer Van Cullen*. This Mr. *Cross* copied likewise admirably well *Titian's Europa*, which picture of his is now in the collection of the Duke of *Kent*.

CRUCIBLE is a little vessel ordinarily made of earth, sometimes iron, without any handle; us'd by coiners, goldsmiths, glaziers and other artificers, for melting and calcining gold, silver, or other metals whereon they work.

Earthen *Crucibles* are made of glaz'd earth, with stone potsh-eards pounded and sifted; they are of various sizes, but generally of the same form, which resembles that of an inverted cone or pyramid.

'Tis these are chiefly us'd in coinage, as being the only ones in which gold will melt without irritating.

Iron *Crucibles* are in the forms of little pails without handles, made of iron well forg'd and beaten; in these are melted silver, copper, &c.

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There are earthen *Crucibles*, that hold from a hundred to three or four hundred marks; but those ordinarily used are but of a hundred; the iron ones are larger, some holding twelve or fifteen hundred marks. These are not taken off the furnaces when the plates are to be run, but the metal is laden out with an iron ladle.

It is a rule never to put so much metal in a *Crucible* as it will hold.

The *Crucibles* us'd by goldsmiths and founders, are like those us'd in coinage; those of chymists, &c. are of all sizes, according to the quantity and quality of the metal to be put in them.

**T**HEODORE CRUGER or GREUGER, an engraver, used this mark.

CRYSTAL is a kind of mineral; or rather a transparent stone, white like a *diamond*, but much inferior to it in lustre and hardness; it is us'd for many purposes.

The antients were but little acquainted with the nature of *Crystal*.

*Pliny* treats of it as water hardened and petrified, which seems to have been the popular opinion of those times; but experience has taught the contrary, for by a chymical analysis, instead of resolving into water, it yields nothing but a calx, earth and salts.

As for the places where *Crystal* is found, they are both rocks and rivers. *Pliny* tells us, that he has seen it dug from off the highest and roughest rocks of the *Alpes*, and thence probably it has taken the name of *rock Crystal*.

And whereas it is sometimes found in rivers and brooks, yet it is not form'd there; but wash'd down thither from off the mountains by violent rains.

Several mountains of *Europe*, and some of *Asia*, produce *rock Crystal*, and the *French* relation of *Madagascar* (if we can give credit to it) informs us, that that island yields more than all the world besides.

The perfection of *Crystal* consists in its lustre and transparency; that crystal which has inclos'd in it straws, dust, clouds, &c. is little valued.

It is frequently found hexagonal, the edges inimitably fine and accurate.

It is cut or engraven in the same manner, and with the same instruments, and by the same workmen as diamonds.

As to the formation of CRYSTAL, it is delivered by F. *Francisco Lana* in the philosophical transactions to this effect.

I have, says he, in the valley *Sabbia*, observ'd a spacious round of a meadow, some parts of which were bare of all herbs; wherein,

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wherein, and no where else thereabouts, *Crystals* are generated, all sexangular, both points terminating in a pyramidal figure, likewise sexangular.

The country people told me, they were produc'd from the dews, because forsooth, being gathered over night, there would others arise only in a serene and dewy sky.

But having observ'd, that there was no mark of a mine thereabout, I concluded it might be a plenty of nitrous steams; which at the same time might hinder the vegetation on those places, and coagulated the dew falling thereon; for *nitre* is not only the natural coagulum of water, as is manifest in artificial glaciations, but ever retains the abovesaid hexangular figure; which, by the way, may be the cause of the hexangular figure of snow.

—— Since *Crystals* are only found in those narrow places 'tis probable, that thence are rais'd those exhalations, which concrete the dew; after the same manner as the vapour or exhalation of lead coagulates quicksilver.

*Robault* shews, that crystal, diamond, &c. must have been originally liquid from their figure, which is such as drops of water of the same size must necessarily have; and such as globules of meal or flower, heap'd up and compress'd by their own weight, might have; for as each crystal is encompass'd and clos'd round with six others, so it becomes modelled into an hexangular body, consisting of equal and square sides.

Mr. *Boerhaave* takes *Crystal* to be the proper matter or basis of all gems or precious stones, which assume this or that colour, &c. from the different admixture of mineral and metalline fumes, with the primitive crystalline matter.

CRYSTAL is also a name given to a factitious body cast in the glass-houses also call'd *crystal glass*.

This is in effect a glass; but carried in the melting, and in the matter of which it is compos'd, to a degree of perfection far beyond the common glass, though it comes far short of the whiteness and vivacity of *Crystal*.

CRYSTAL, the way of calcining natural (or rock) crystal, to make an extraordinary FRITT.

Altho' we may imitate natural *Crystal* by help of art, and make as fine with the materials we have shewn elsewhere how to prepare; yet the way we are going now to describe of making a fritt of natural *Crystal*, will make one so extraordinary, that it will surpass in beauty all we have shewn the preparations of.

Make natural *Crystal* red hot in a crucible covered close; then extinguish it in water, and reiterate the same eight times, then dry it well, and grind it on a stone to an impalpable powder.

Often

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Often purify this powder of *Crystal*, after the same way as is shewn for the purifying *polverine* of *Rochetta*, which see, observing all what is said on that subject.

Then mix that crystalline matter with about one third part of salt extracted from *polverine* of *Rochetta* prepar'd, make a fritt of it, then put it in a pot well heated in the furnace, and when it is in good fusion, add to it a proportionable dose of prepar'd manganese.

After that, often pour it into the water to purify, as is noted in ordinary *Crystal*, and purify it very well at the fire before you work it, and you will have a *Crystal* more shining and beautiful than you have otherwise ever seen.

*The way of preparing natural CRYSTAL.* This is done by calcination, which to perform well, observe the following directions.

Take the fairest natural *Crystal* you can get, that being the basis for artificial gems; it is no matter whether it be in great or small pieces.

With these pieces of *Crystal*, fill a large crucible, cover it with a cover made of the same earth, that is somewhat broader than the mouth of the crucible, for fear ashes or coals should tumble in.

Set this crucible in burning coals in a little furnace, and when the *Crystal* is well heated, cast it into a vessel of cold water; the more water there is, so much better will the calcination be perform'd, because the cold of it is so much the greater.

Then take it out of the water, and dry it in an earthen ladle; then put it into the same crucible to be heated again, taking care to cover it well; then cast it again into fresh cold water, and repeat heating it and quenching it thus twelve times, changing the water each time.

You may know if your *Crystal* be well calcin'd, for it will easily break and crumble; if there appear in it any black veins, you must take care to take them all clean out by breaking them, and do this till only the white remains behind; then it is well prepar'd.

After you have well dry'd your *Crystals* thus calcin'd, grind them to an impalpable powder on a marble or porphyry stone, by putting a little on at a time, and searce it well through a fine silken sieve.

This powder of *Crystal* being what is us'd for all artificial gems, it will be proper to keep a good quantity ready by you, which you may always have recourse to in working.

If you would succeed very well in this art, you must not use ordinary *fritt* of *Crystal*, how good and fair soever it be, nor *chalcedony*, nor *tarso*, nor any other stones; for the glass made  
of



of them is far less fair and resplendent than that made of natural *Crystal*, which has the most lustre, and approaches the nearest to precious stones.

*To make PEARL colour in CRYSTAL.* True pearl colour is so fine and shining, that it might seem difficult to give it to crystal; yet it is so easy, that tartar alone does it.

Those who have a mind to perform this process, must calcine their tartar, till it becomes white. See *calcination* of TARTAR.

The having well purified the fritt of the natural *Crystal*, and it being in a good fusion in the furnace, this white tartar must be cast into it at several times, mixing the whole well each time, which must be continued to be done till the glass becomes of a pearl colour; for there is no other rule in this case than experience to guide your self by.

When the colour is come to perfection, it must be wrought presently, because the colour will soon be lost; but works may be made of it of extraordinary beauty.

*To make a very fair CRYSTAL of salt of lime.* The salt of lime, with which walls are built, is now more in use in making glass.

It is much stronger than the ordinary salt, and being well purified, you may put two pounds of it to a hundred pounds of salt of *polverine*, of which a *fritt* must be made and purified well, as is shewn. Of this *fritt*, you may make common glass, and also *Crystal* and *crystalline* fair and beautiful.

*Ferantes Imperatus* recommends the salt of testaceous fishes, such as oyster shells, &c. as very proper for making glass. There may be made of these shells a very good lime proper for cement, and which yields a very strong salt; but tho' this salt makes the glass white, yet it is not so transparent as that made of *kali*, and will most of it run in the pots into *sandever*.

*The way to make a very fine and perfect CRYSTAL.* This crystal will be white, very bright, clean and beautiful, if care be taken in the managing of it in the working.

Take *Crystal* fritt, prepar'd, and put it into a little pot in the great furnace, putting into it by little and little, and at some interval of time, as much *manganese* of *Piedmont* as is sufficient, after it has been prepar'd.

The *fritt* being thoroughly melted, you must take out the pot, and put it in a great earthen vessel full of cold water, or in clean wooden vessels.

This way of putting the fritt into water serves to take from it the *sandever*, which is noxious to the *Crystal*, and makes it obscure and cloudy, and very disagreeable to the sight.

Then

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Then put it again into a clean pot, and being melted, cast it again into water, which must be repeated until the *Crystal* be separated from all this sort of salt.

In the last place, let it stand five or six days in the pot in the oven to boil, and stir it as little as possible with the iron; for it is apt to discolour it, and so make it blackish.

Being well boil'd and clear, see if it hath *manganese* enough, which may be known by inspecting it, (*viz.*) if it be white; but if it be still greenish, you must add more *manganese* to it, and then let it boil till it is clear, and of a shining colour.

The property of *manganese* added to it in due quantity is to perfect the *Crystal*, and to take from it a foul and dull green, and give it a bright and shining whiteness; you must take heed to add by little and little, and by degrees; otherwise it will rather spoil than perfect the crystal, blacking it, and taking away its lustre.

All this depends on the skill and discretion of the workman, for there is no certainty or standing rule for the quantity to be added.

As soon as your *Crystal* is fine and shining, you may use it without delay, for what vessels or other works you design to put it to; but in the mean while, you must have less fire than for common glass, and it must be very clear and without smok, for reasons elsewhere given.

Moreover the workman must take care, that his iron rods be clean and well polish'd, and that the necks or collets of the glasses where the irons touch them, be always kept out of the pots of *Crystal*, because the iron always discolours the *Crystal*; wherefore particular care is to be taken as to that matter.

None of our modern workmen (or at least very few of them) take the pains of this way of separating the *sandever* from their materials, by casting them into water; they content themselves with skimming it off with an iron ladle, when it swims on the top; tho' if it does not all separate, the *Crystal* and glass will be less clear and fine.

*The way to extract salt of FERN, which will make a fair CRYSTAL.* The daily experience of salt of *fern* in the glass-houses, assures us of its usefulness in making glass.

It grows on mountains and heaths. It ought to be cut from the end of *May* to the middle of *June* (*i. e.* in *France*,) for then it is best and yields more, better and whiter salt than if cut at any other time; for if it be let alone to dry of it self on the ground, it will give but very little salt, and that not good neither.

It must therefore be cut in its full growth, just as it runs to seed; then let it dry, and burn it.

You

You will have from it very good ashes, from which (observing the rules given for the salt of *polverine*,) a good and fine salt may be extracted; which being afterwards purified with it, and *tarso* or very fine sand, a *fritt* may be made, which will yield a very fair *Crystal*, much better than the ordinary, and will be strong, and bend much more than one would conceive the nature of *Crystal* would permit; so that it may be drawn into fine threads, as has been often experienc'd. With this *fritt* may be made a fine gold colour, if you mix no salt of *tartar*, and which will be as fine as that made of salt of *polverine*.

This is as good as the first, to make all sorts of vessels, which will be as fine also, if the salt be well purified.

*Observations for a gold colour in CRYSTAL.* Gold being the purest and most perfect metal in nature, must needs require materials very pure to imitate it.

This obliges us here to note, that to make a *Crystal* of a fine gold colour, the *fritt* must be made of fine salt of *polverine*, prepar'd and purified as is taught elsewhere, which is the only means of obtaining it.

For if there should be mixt any of the *fritt* made of the salt extracted after the common way, by the help of *tartar*, the colour would be very imperfect, wanting the true splendor and beauty.

*To make a sky colour and sea-green in CRYSTAL.* This fine colour requires a *Crystal fritt* well purified from its salt, and that has not been put into water.

Put sixty pounds into a pot, and having well prepar'd it, put in one pound and half of scales of copper in powder, the preparation of which is shewn, with four ounces of *zaffer* prepar'd and mix'd together, and stir the whole well with the glass for the space of two hours.

Then examine if the colour be to your mind, and let it stand at rest for twenty four hours; then stir the whole again as before, that it be well mix'd with the glass, and the colour incorporated with it; then it may be wrought.

The colour may be heightened as you please, but take care you do not make it too high.

If you mix with *fritt of rochetta*, as much *Crystal fritt*, you'll have as fine a blue as can be wish'd.

*A sky colour or sea-green in CRYSTAL.* You must use for this colour, which is a little close, the same *Crystal fritt* made with *rochetta* or *polverine* of the *Levant*; and having fill'd a pot with it, let it be well purified, taking off the salt that swims at top; then put to it twenty pounds of metal, six ounces of the powder of calcin'd copper, by little and little stirring it well, observing the same rules given for the seagreen before. Then you

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will have a very admirable colour, which you may make lighter or deeper as you please.

Two hours after, stir it again well, and you may then examine if the colour pleases you, in which case, let it stand still twenty four hours without any stirring, and then it may be wrought as before.

*The way to tinge natural CRYSTAL of a viper colour.* The green viper colour is very dangerous to make by reason of the materials, of which it is compos'd, if great care be not taken.

Take two ounces of rock *Crystal* of a good water, two ounces of crude *antimony*, and as much orpiment, with one ounce of *sal armoniac*; reduce these three last into powder, lay the pieces of *Crystal* layer upon layer in a good crucible, cover it with another that is bored through the bottom; lute them well together, and when the lute is dry, set them into a furnace in the middle of the coals; let them be gently lighted, that the furnace may grow hot by degrees.

It will smoak very much when it first grows hot, wherefore the operation must be perform'd in a large chimney, that the smoak may fly away, nor must you stay in the laboratory, because it is very dangerous, and may prove mortal.

Let the fire kindle of itself, and go out, and the crucible grow cold, then take out the pieces of *Crystal* that lye on the top of the crucible, which will have the colour of rubies, and be mark'd with fine spots; and those that are at the bottom will for the most part have the colour of vipers.

Separate the other pieces from them, which will be of other colours, and polish the whole at the wheel like other stones; then with foils you may set them in gold.

These stones will be of a very agreeable colour.

*To make in natural CRYSTAL, the colour of rubies, topas, opal, gyrafol and others.* It does indeed seem something strange that *Crystal* mix'd with matters that tinge them, should in the same vessel receive so many different colours.

But if it be considered, that the spirits of these matters have virtues different from those of their bodies, you will not so much wonder at these diversities.

The pieces which lie highest, are the most penetrated by these tinging spirits, which always ascend, and so give them more vivacity and colour; and so to the others in proportion to their orders.

*For this operation.* Take two ounces of orpiment of a yellow colour approaching gold or saffron, and as much white *arsenic*, one ounce of crude *antimony*, and an ounce of *sal armoniac*, reduce them all to powder, and mix them together; with this powder, stratify pieces of natural *Crystal*, in a large crucible,

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putting the least pieces to the bottom, and the biggest at the top, which ought to be fine and without spots.

The crucible being fill'd with the powder and *Crystal*, cover it with another bored at bottom, lute them well and let the lute dry. This crucible is bored to let the fumes of the materials ascend through the hole, and by that means tinge the *Crystals* in passing, which they would not do so well if they pass'd out at the sides.

When the lute is dry, set the pot in the furnace, and cover it with coals up to the middle of the crucible towards the top, then put some live coals to them, that they may kindle by themselves by degrees; the coals ought to be large ones and made of oak.

Go out of the laboratory presently to avoid the fumes, which are dangerous as was said before, but prepare the fire so well that it may kindle of itself, and burn well that the business may succeed, and let the fire go out of itself, taking care that no air can get in at the mouths of the crucibles; for that would make the *Crystals* break, and then they would be good for nothing.

When the crucibles are grown cold, unlute them, and take out the *Crystals*, the greatest part of which will be tinged with the colours beforementioned; let the best of them be polish'd at the wheel, which will also brighten their colours, and make them look like oriental stones, and they will be fair and hard as they are.

All the success of this secret consists in the orpiment, which must be of the colour of gold; and if you should not succeed the first time, you must try a second.

*An admirable BLUE CRYSTAL.* To procure this fine colour take one ounce of powder of *Crystal*, one dram and fifty six grains of fine salt of *tartar*, the whole reduc'd to a fine powder, put it into a crucible covered and luted, which bake and purify twenty four hours in a glass-house furnace, then set it to cool gently twelve hours in the annealing furnace, and you will have very admirable *Blue*, which you may cut and polish, &c.

*The way to make a salt of several vegetables, which will produce a CRYSTAL of a wonderful fineness.* It has been observ'd, that the salt which serves to make glass is extracted from *polverine* of the *Levant*, from *rochetta* and *soda*; and the way of extracting it is there shewn; here I shall acquaint you, that any vegetable that abounds with alkalious salts is proper to make glass and *Crystal*, by preparing its ashes as there shewn.

Several plants are good for this purpose, but those that grow near the sea-side are always the best, because they acquire a great deal of salt by their nearness to the sea.

*Alga* is one of them. See *ALGA*.

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*Pot-ashes* are also proper on this account, they are brought from *Poland*, *Russia*, and *New England*; and are ashes, for the most part of firs and pines, and their apples.

The salt of all sorts of ashes may serve for common (or green) glass, notwithstanding that of the ashes of the common thistle is the best; but all sorts of thistles are good.

Next to *thistles*, hops are the best, taking both stem and branch when the flowers are gathered.

Among trees the *mulberry* is the best (*C. M.* says, the *bramble bush*) as also *genista spinosa*, and the *haw-thorn*, and *black-thorn*, which bears black-berries, and among the sea-plants, *kali spinosum*.

So that it seems, that those plants which are thorny and prickly afford in their kind the best and most salt.

All rushes and reeds which grow in marshes and in pools, and in ditches of water, and on banks of rivers, yield a great deal of salt fit for these purposes.

Next to the beforementioned are all bitter herbs, as *hops*, *wormwood*, *carduus benedictus*, *centaurie*, *gentian*, *southernwood*, *tansy-wood*, which they use in dying wool, the heads of *poppies* and several other plants; *tobacco-stalks*, all leguminous plants have the same vertues; *bean-cods* and *stalks* yield an admirable salt for making *Crystal*, *peas*, *vetches*, *millet*, *lupine* and *lentils*, as also *cabbage-heads*, and several other sorts of plants.

Add to these milky plants, all sorts of *tithymals* or *spurges*, *cataputium*, the *fig-tree*, *vine branches* and *sow-thistles*.

Of all the fix'd salts which are extracted from plants, observe, that those are the best that are freest from earth, and all sorts of heterogeneous bodies, and which are united in the hardest and whitest lumps, and are most sharp to the taste.

That the best ashes and fullest of pure salt run soonest in the furnace.

That those are the best ashes of vegetables that are made while they are green, and of the biggest branches.

That those salts must be diligently kept in a dry place, remote from any moisture, that may be hurtful to them; that the ashes of *oak* which partake of a vitriolick nature make a glass of a darker colour; and *ash* and *hawthorn*, their salts being more *nitrous*, make the whiter-metal.

*C. Schoenius*, signifies *Martin Schoenius*, a *Calembach* painter and engraver in the flourishing of *Albert Durer*. He died in the year 1486. some of the curious suppose him to be the same with *Buonmartino*.



CUERENHERT, his mark in several *Turkish* stories, and various subjects, invented by *Martin Hemsherk*.

## C U R

**CURIOSITY**, is represented in painting, &c. by a woman having abundance of ears and frogs on her robe ; her hair standing up an end, wings on her shoulders, her arms lifted up, she thrusting out her head in a prying posture.

The ears denote the itch of knowing more than concerns her, the frogs are emblems of inquisitiveness, by reason of their goggle eyes ; the other things denote her running up and down to hear and see as some do after news.

**CUSTOM**, is represented in painting, &c. by an ancient man in a walking posture with a grey beard, leaning on a staff with a label inscrib'd, *vires acquirit eundo*, with a burden of musical instruments and a grindstone by him.

His age shews, that the more he advances in time the firmer does he stand, intimated by the motto, to which agrees the grindstone also, for if it be not turned, it has not the force to wear the knife by grinding ; the laws of custom are valid and always prevail.

**CUTTING in wood**, is a particular kind of sculpture or engraving, denominated from the matter wherein it is employ'd.

It is us'd for various purposes, as prints and stamps for printing paper, linens, calicoes, &c.

The invention of cutting in wood, as well as that of copper is ascrib'd to a goldsmith of *Florence* ; but they both owe their perfection to *Albert Durer* and *Lucas*.

One *Hugo de Carpi* invented a manner of cutting in wood, by means of which the prints appear'd as if painted in *clair obscure*, in order to this he made three kinds of stamps for the same design ; which were drawn after one another through the press for the same print. They were so conducted, that one serv'd for the grand lights, a second for the demi-teints, and a third for the out-lines and the deep shadows.

The art of *cutting in wood* was certainly carried to a very great pitch a hundred and fifty years ago, and might even vie for beauty and justness with that of engraving in copper.

At present 'tis but in a low condition, as having been long neglected, and the application of artists wholly employ'd on copper, as the more easy and promising province ; not but that their wooden cuts have the advantage of those on copper on several accounts ; chiefly for figures and devices in books, as being printed at the same time, and in the same press as the letters ; whereas the other requires a particular impresson in the rolling-press.

The *cutters in wood* first prepare a block of the size and thickness requir'd, and very even and smooth on the side to be cut, the wood of these blocks is usually peartree or box, though the latter is the best, as being the closest and least liable to be worm eaten.

On



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On this block they draw their design, with a pen or pencil just as they would have it printed.

Those who cannot draw their design, make use of the design furnish'd them by another, fastening the paper upon the block with a sort of paste made of flower and water with a little vinegar, the strokes or lines turn'd towards the wood.

When the paper is dry, they wash it gently over with a sponge dipp'd in water; which done, they take off the paper by little and little, still rubbing it a little first with the tip of the fingers till at length there be nothing left on the block, but the strokes of ink that form the design, which mark out so much of the block, as is to be spared or left standing.

The rest they cut off, and take away very curiously with the points of very sharp knives, or little chissels or gravers, according to the bigness or delicacy of the work.

**CUTTING** in *painting*, is the laying one strong lively colour over another without any shade or softening. The *Cutting* of colours has always a disagreeable effect.

## D.

**D.** Stands for *Domenichino* of *Bologna*, a famous painter and inventor.

**DANGER** is represented in painting, &c. by a stripling walking in the fields, treading upon a snake, which bites his leg; on his right side is a precipice, and a torrent on the other; he leans only upon a weak reed, and is surrounded with lightning from heaven.

His youth shews the danger he is in; his walking shews that men walking through flowry fields of prosperity, fall into some calamity unawares; the reed shews the frailty of our life in continual danger; the lightning, that we are subject besides to danger from heaven.

**HENRY and JOHN DANKERS.** *Henry* was a good landscape painter, and employed by King *Charles II.* to paint all the sea-ports of *England* and *Wales*, and also all the royal palaces, which he performed admirably well; he was first bred a graver, but upon the persuasions of his brother *John*, took to painting; he studied some time in *Italy* before he came to *England*; he worked for a great number of our gentry, and had good rates for what he did, being esteemed the neatest and best painter in his way of that time. He left *England* in the time of the *Popish* plot, being a *Roman* Catholick, and died soon after at *Amsterdam*.

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As for *John Dankers*, he was a good history painter, and lived not many years after his brother; dying in the like manner in *Amsterdam*.

**P**ETER DARET, who engrav'd various portraits, us'd this mark.

*The DARK way of PAINTING.* As to the colours, they are prepar'd in the same manner as the other colours are for the light way of painting, (for which see the article *LIGHT way of PAINTING* in letter L) except that there must not be any egg us'd in them.

In the first place, you must mark the paper with *black lead*, if they be white; and with *tobacco-pipe clay*, if they be dark. This you may do at pleasure, because you can't spoil it; only take care that you mark out the figures as lofty with the landscapes as you can; then take a little blue *verditer* and *flake white* for the sky, in which you need not be difficult, because you must go over it again.

Then dash out at pleasure, and where you please with the blue, with a little *lake*, or *rose-pink* and *flake white*.

Then strike at the bottom of the sky, but not on the blue, with a little *red-lead* and *flake white*, and a little yellow; all which may be done as quick and rough as you please.

After you have done this, lay the distant hills with a little blue *verditer* and *flake white*, but inclining most to the *verditer*; then for the nearer hills, lay them with the same colours, and a little rose pink added to them.

With this colour also you may lay distant houses or towers; and then give a strike on the colour that is the nearest your pattern with *flake white*, blue *verditer* and *Dutch pink*; then lay it here and there under the white and yellow; add a little *Spanish brawn* to the green, and so whatever green you please to make, do it by dipping your pencil into any other colour, mixing it with the aforesaid green for variety.

Here and there you may intermix a purplish colour, and so work in all manner of colours, according as you shall please.

Observe to make the lowest colours the darkest part of the landscape, and lay in the houses and trees, as you come down with the grounds. All this you may do at pleasure, for the finishing will set all to rights; nor will it be any matter, if in the colouring your ground is gone over with your colours here and there.

Then draw your figures more perfectly with *verdesey*, *carmine* and *litmose*. This likewise you may do without fear; because when you come to lay the colours of the figures, that will make all right.

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After you have drawn the figures, look and fill up every place that is left with colour; and afterwards go over the sky that you made before, with a large pencil, with a little *blue smalt* and *flake white* mix'd well to a fair sky, leaving the light part of the sky clear at the bottom; then shadow the remote hills here and there with *blue smalt* thin; and where they are deepest, with the thick part of the colour: then do the purplish hills with *blue smalt* alone, and sometimes *carmine* and *litmose*, or *gambooge* and *litmose*.

Make the distances in as many different colours as you can, letting your distant *blue greens* be shaded with *litmose* and *gambooge*, to which a little *indigo* may be added. Shade the distant *yellow greens* with *gambooge* and *verdegrease*; and *reddish greens* with *gambooge*, *verdegrease*, and *red-oaker*.

Let some of the distant grounds incline to *blue*, some to *greenish*, some to *yellowish*, and some to *reddish*.

When you have shaded the distant, shade the nearer things, such as trees, cattle, rocks, ruins, &c. For blue trees, take *indigo* and *verdegrease*; if yellow, *gambooge* and *verdegrease*; and in the darkest, add a little *indigo*; if reddish, *red-oaker* and *verdegrease*, and shade ruins with *gambooge* and *litmose*; if reddish, add *carmine*; if bluish, add *litmose*; observing that the darkest shade for cattle, ruins, grounds, or the stumps of trees, is generally *carmine*, *verdegrease* and *litmose*; only in the darkest of all, add a little *indigo*.

This will do for cattle, birds, buildings, dark grounds, dark garments, the darkest shade of the face, and stalks of trees.

When the distant things have been shaded, strike the dark shades under the figures, which will be a direction to you in the grounds; and so shade the rest of the grounds with a *yellow*, *bluish*, and *purplish* shade, taking care not to mix any earth colours with them; unless it be black with *gambooge* or *indigo* with *carmine* and *verdegrease*, and this must be done but seldom.

If the *litmose* and *verdegrease* be both thick, you will seldom want earthy colours; and so finish the shades in the landscapes.

For seas, use *litmose*, *gambooge*, and *indigo*, mixing it to a purplish sea-green; for dark waters, *indigo*, the darkest *carmine* and *verdegrease*, inclining most to *indigo*; if light waters, thin *indigo*.

Herbs are to be done after the same manner as trees.

Then lighten the landscape thus: for clouds, use *French oaker* and *flake white*, laying it thin at first, and then work it thicker with *red lead* and *flake white*, or *carmine* and *flake-white*, which you must do to all the lightening colours.

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After you have done the landscape thus far, you may lay in the figures in the following manner.

Draw the figures with *carmine*, *verdegrease*, and *litmose* without fear; for if you are out, the colouring will make all right.

Then lay in the proper colours, and cover the strokes you have drawn; because these not being perfect, are only for a direction for you in laying the colours bold and free.

In colouring the garments, for *blue* ones, use *blue* and *white*; for a *rose* colour, *carmine* and *white*; for *green*, *blue verditer*, *Dutch pink* and *white*; for a *purple*, *blue verditer*, *rose pink* and *white*; for *yellow*, *rose pink*, *Dutch pink* and *white*, and so add *white* to any earthy colour, according to your fancy.

In colouring faces, for a fair one, use *red lead*, *carmine* and *white*; for *red*, more *red lead*, and some *yellow*; for *dark* ones, add a little *litmose*; for *brown*, add some *umber* or *yellow oaker* to the *red lead* and *white*.

For fair hair, take *umber* and *white*, or *yellow oaker* and *white*; for *dark*, *burnt umber*, or *Spanish brown* and *white*.

First, lay the garments, then the faces, then the hair, and then the girdles.

Having thus laid the figures, draw out the figure as perfect as you can with *verdegrease*, *litmose* and *carmine*; because this will be a guide to you in all the shadows.

When you have done this, shadow them thus: for a *rose* colour, use thin *carmine*; in the darkest shades, use *rose pink* and *carmine*, or *lake*; for a deep *blue*, gloss over the *blue* with *smalt*; and when it is dry, shade with *litmose*, and in the darkest parts with *Colens earth* and *carmine*; for *yellow*, *gambooge* and *umber*; for a *straw* colour, *gambooge* and *black*; for *purple*, *carmine* and *litmose*; for a *cloth* colour, *carmine*, *verdegrease* and *litmose*.

For linings, use *litmose*, *gambooge* and *indigo*.

For cattle, buildings, or ruins, use *verdegrease*, *litmose* and *carmine*; if the shadows are to be *blue*, take more *litmose*; if *yellow*, *gambooge*; if *red*, *carmine* and *verdegrease*.

For umbering the faces, use *carmine* and *verdegrease*, adding *litmose* for a fair one.

With this shading, you may shade all faces, taking care that if the face is to be fair, to add more *litmose*; if *red*, more *carmine*; if *yellow*, more *verdegrease*.

After that the faces have been shaded with these shades, then for a fair face, take *French yellow-oaker* and *flake white*, and heighten the lightest parts of the face; then add a little *carmine*, and lighten the darkest side; and afterwards smooth the edges of the light parts, that the colours may lie as if put on at once.

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Having done this, go over the dark shades with *carmine*, *verdegrease* and *litmose* to make them look clear, giving the darkest some touches with the said colours.

Then shade the blushes of the fair face with *carmine* and a little *red lead*; and afterwards shade the bluish parts of the face with a little *litmose*, taking care not to put it where the red should be.

After the faces have been umbred, shadow the hair of the figures as follows:

For fair yellow hair, use *verdegrease*, *carmine* and *gambooge*; if darker, more *litmose*; if very dark, *carmine*, *verdegrease*, *litmose* and *indigo*, or *black*.

After the faces have been lightened by their proper colours, then lighten the hair, and for a fair yellow hair, use *French-oaker* and *flake white*; for darker, add more *oaker* and *litmose*, and so more of the same for the darkest.

When you are finishing the faces with blue shade, which is thin *litmose*, strike the darkest sides of the hair with it; and this will make it look soft and well.

*The way of finishing the garments.*

For a rose colour garment, use *carmine* and *flake white*, and here and there use a little *yellow* or *red oaker*.

For a green garment, use *blue verditer*, *Dutch pink*, and *flake white*.

For a crimson one, use *carmine* and a little *flake white*.

For a yellow garment, use *Dutch pink* and *flake white*.

For a cloth colour garment, use *Spanish brown* and *flake white*, or *umber* and *flake white*, or *black* and *flake white*, or *umber*, *litmose* and *flake white*; or any mixture of colours, according as your fancy directs you, adding *flake white* to it.

As to the farther finishing of the face, it is the same as that mention'd in the *light way of painting*; but use no egg at all.

**DARK TENT** a portable *camera obscura*, made not unlike a desk, and fill'd with optick glasses, to take prospects of landscapes, buildings, fortifications, &c. See **CAMERA OBSCURA**.

**DAVID**, King of *Israel*, is represented with brown hair, a ruddy complexion, and with a long beard.

**NATURAL DAY** is represented in painting, &c. by a winged boy, with a circle in his hand, in a chariot above the clouds, with a lighted torch. The chariot drawn by four horses, one white, one black, and the other two bay, signifying the four parts that make up a natural day, *i. e.* the rising and setting, noon and midnight; all the time the sun spends in going once round the whole orb, which the circle shews.

## D E A

D. B. signifies *Bernard Gallo*, call'd *the short*. He engrav'd several works, and among the rest *Ovidii Metamorphoses*, and the old and new Testament, printed at *Lyons* 1559.

A DEAD COLOURING [in miniature] to represent death.

In the first place, lay on *white* *orpiment* and *oaker* very pale, and then proceed with *vermilion* and *lake*, instead of *carmine* and a great deal of *white*, and work thereon with a green mixture, in which is more *blue* than of any other colour, that the flesh may appear livid.

The teints must be the same as for another colouring; but there must be more of them *blue* than *yellow*, particularly for the retreating parts, and about the eyes, and the yellow teint is to be us'd for the parts which advance farthest out.

These teints must be made to dye away in each other, after the accustomed manner, sometimes with a very pale blue, and sometimes with *oaker* and *white*, and a little *vermilion*, softening the whole together; the parts and the out-lines must be rounded off with the same colour.

The *mouth* must be almost a *purple*; but nevertheless you are to begin upon it with a little *vermilion*, *oaker* and *white*, and finish with *lake* and *blue*; and for the stronger strokes, you must use *bistre* and *lake*, which are us'd also for the eyes, the nose, and the ears.

If it be a *crucifix*, &c. where there must be an appearance of blood; after the flesh is finish'd, you must colour with *vermilion* and finish with *carmine*, swelling out the drops of blood, and giving them a roundness.

As for the crown of thorns, lay on *sea-green* and *masticote*, and shade with *bistre* and *green*, and refresh the lights with *masticote*.

DEATH is represented by a skeleton, cover'd with a rich mantle, embroidered with gold, and his face covered with a fine mask.

The skeleton, &c. declares, that whilst he strips grandees of all that they have, he cures the afflicted of all their trouble; the fine mask, that he is gentle to some, terrible to others, indifferent to the couragious, and odious to cowards.

DEBT is represented in painting, by a melancholy young man, with a green bonnet on his head; a plate of iron upon both his legs, and about his neck; holding a basket in his mouth, and a scourge in his hand.

Melancholy, because in debt; poor clothes, his finding no more credit; the green bonnet alludes to the custom of some countries, where such who are bankrupts, are forced to wear them; the scourge, because debtors in *Rome* were whipped.

DECEIT

## D E L

**DECEIT** is represented in painting, by a man cloathed with the skin of a goat; from the middle downwards are two serpents tails, in one hand fishhooks, in the other a net full of fish; a panther by him, with his head between his legs, which shews that fish are catched by deceiving them; and the panther, by hiding his head, and shewing his fine skin, is said to intice other beasts; and the two serpents tails, shew deceit.

**DECEMBER** is drawn with a horrid aspect, clad in an *Irish* rug or coarse frize girt about him; upon his head, three or four night caps, and over them a *Turkish* turbant; his nose red, and his beard hung with icesicles; at his back, a bundle of holly and ivy; having on his hands furred mittens, holding a goat.

**DECENCY** is represented in painting, &c. by a youth of a gentle aspect, with a lion's skin on his back; in his right hand he holds a cube, in the middle of which is the cypher of *Mercury*; a branch of *amaranthus* in his left hand, with this motto, *Sic floret decoro decus*; his garment is embroidered with the same, and he wears it for a garland; on his right foot a buskin, on his left a sock.

Handsome, because decorum is the ornament of human life; genteel, because always accompanied with decency; the lion's skin denotes the strength of mind assigned to the observers of due decorum; the *amaranthus* denotes continuance, for that never withers, as the motto demonstrates; the *Cothurnus* and *Soccus*, or buskin, denote decency in the gesture and behaviour; the first belonged to noblemen, the other to the inferior sort.

**DEFENCE** is represented in painting, &c. by a young lady in armour, holding a naked sword in her right hand; in her left, a target, and hedge hog in the middle.

Her youth denotes her fitness to defend her self; the armour and sword, both offensive and defensive actions; the hedge hog denotes defence, which upon any danger will roll itself in its prickly skin, bidding defiance.

**DEFENCE** against **ENEMIES** is represented in painting, &c. by a lady, whose head-dress is set with precious stones; in her hands a squill, or sea onion; a ferret at her feet, with rue in its mouth.

The precious stones denote charms against evil; the squill, they say, rubbed upon a gate, lets no evil come in; the ferret provides rue for its own defence, against the basilisks, &c.

**DEJECTION.** See **SORROW**.

**DELIGHT** is represented in painting, &c. by a boy of sixteen, with a pleasant aspect, in a green suit, adorn'd with various colours; a garland of roses, a violin and its bow, a sword, a book of *Aristotle*, one of musick; two pigeons a kissing.

His



## D E P

His countenance denotes delight; the green signifies the vivacity and delightfulness of green meadows to the sight; the violin, delight in hearing; the book, delight in philosophy; the doves, amorous delight.

**For** **SB**

STEPHEN DELLA BELLA of *Florence*, a famous and whimsical engraver, used these marks; his other mark is S B.

DEMOCRACY is represented in painting, &c. by a lady meanly dressed, with a garland of vine twisted, with a branch of elm standing upright; holding a pomegranate in one hand, and serpents in the other; some corn scattered upon the ground, and some in sacks.

The garland denotes the union; the mean habit, the condition of the common people, that cannot equal those that are higher, and therefore she stands up; the pomegranate denotes a people assembled into one body, whose union is regulated according to their quality; the serpent union, but creeps, not daring to aspire; the grain, the publick provision, causing union.

DEPART, is a method of refining or purifying gold by means of *aqua fortis*.

There are three different ways of refining gold: The *first* is by *antimony*, the *second* by *sublimate*, and the *third*, which is most usual, by *aqua fortis*.

As to the operation of the DEPART; they take at the rate of one pound of pure gold, and two of silver; these they fuse together in a crucible, and when fus'd, cast them into cold water, where they become divided into grains of the bigness of peas.

These grains being taken out and dry'd by the fire, are put into a *departing* vessel, which is a stone matrafs, and to the metal is added four pounds of *aqua fortis*.

Then they take the vessel and set it on coals, and in about the space of an hour the refining is finished; for upon opening the vessel they find nothing therein but the *aqua fortis*, and the gold reduc'd into a *calx* or sand; the silver being all dissolv'd and imbib'd by the water.

To raise the gold to its due fineness, they usually give it the *aqua fortis* again and again; using for the first time, half a pound, and for the second, a quarter of a pound of the water to eight ounces of metal.

If the third water be found good and clear, the operation is finish'd; and the calx of the gold wash'd in repeated water is melted down again in a crucible, first by a gentle, and after by a vehement fire, to be cast into ingots or wedges.

It is to be observ'd, that the silver together with the impurities of the gold, are so thoroughly incorporated with the water, that

## D E S

that there does not appear to the eye any thing but the pure liquid ; yet is not this silver lost.

In order to recover it again out of the *menstruum*, they divide the stock of *aqua fortis* into several stone vessels, which are fill'd up with spring water ; observing to put seven or eight times as much of this as of that.

This being done a quantity of *copper* is put into each vessel, and the whole is left for twenty four hours, at the end of which time the spirits of the *aqua fortis*, is found to have quitted the silver, and to have incorporated with the copper, leaving the silver in the form of a *calx* or ashes at the bottom.

This *calx* being dry'd, is melted into an ingot with a little salt petre.

To be good husbands of the *aqua fortis*, and make it serve again for a second operation, they distil it in an earthen or glass alembick, and when the distillation is about a third over, they change the recipient.

If the *aqua fortis* having quitted the *silver*, and being united with the copper be then filtrated, it is call'd *aqua secunda*. In which, if you steep an iron plate some hours, you will have another *Depart*. For the *menstruum* will let go the copper and prey on the iron, leaving the copper in powder on the iron-plate.

And by filtrating this dissolution, you may also get the *iron* out of it by laying in it a piece of *lapis calaminaris*; for the *iron* in that case will *depart* to the bottom and the *lapis* will be dissolv'd.

And if you again filtrate this water, and pour on it the liquor of *fix'd nitre*, you will have another *Depart*; the *lapis* precipitating to the bottom.

And lastly, filtrating this water as before, and evaporating it, you will have crystals of *salt-petre*.

WILLIAM DERYKE, was a history painter born at *Antwerp*, he was first bred a jeweller, but afterwards took to painting. He for many years drew history as big as the life in *England*, with tolerable success in his works ; there were many excellent parts of a boldness of pencil, whatever there might be wanting in grace and a pleasing variety ; he died about thirty three years ago, leaving behind him a daughter, whom he had instructed in this art.

DESIGN or draught is us'd to signify the thought, plan geometrical representation, distribution and construction of a *painting, building, &c.*

In building it may be call'd *ichnography*, when by *Design* is only meant the plan of a building, or a flat figure drawn on paper.

Or

## D E S

Or *orthography*, when some face or side of the building is rais'd from the ground.

And *scenography*, when both front and sides are seen in perspective.

DESIGN, is also particularly us'd in painting, for the first idea of a large work, drawn roughly, and in little, with an intention to be executed and finish'd in large.

In this simple sense, the *Design* is the simple *contour* or outline of the figures or things intended to be represented; or the lines that terminate and circumscribe them.

Such a *Design* is sometimes drawn in crayons or ink, without any shadows at all, sometimes it is *hatch'd*, that is the shadows are express'd by sensible lines, usually drawn across each other, with the pen, crayon or graver.

Sometimes again, the shadows are done with the crayon rubb'd, so that no lines do appear at all; and sometimes the grain or strokes of the crayon appear as not being rubb'd.

Sometimes the *Design* is *wash'd*, that is the shadows are done with a pencil in *Indian ink*, or some other liquor; and sometimes the *Design* is *colour'd*, that is colours are laid on, much like those intended for the grand work.

The qualities or parts requir'd in a *Design*, are correctness, good taste, elegance, character, diversity, expression, perspective.

*Correctness* depends principally upon the justness of the proportions, and a knowledge of anatomy.

*Taste* is an idea or manner of *designing*, which arises either from the complexion or natural disposition, or from education, the masters, studies, &c.

*Elegance* gives the figures a kind of delicacy, which strikes people of judgment, and a certain agreeableness, which pleases every body.

The *character* is what is peculiar to each thing, in which there must be a *diversity*, inasmuch as every thing has its particular character to distinguish it.

The *expression* is the representation of an object, according to its character, and the several circumstances it is suppos'd to be in.

The *perspective* is the representation of the parts of a painting or figure, according to the situation they are in, with respect to the point of sight.

The *Design* or *Draught* is a part of the greatest import, and extent in painting. It is acquir'd chiefly by habit and application, rules being of less avail here, than in any of the other branches of the art, as *colouring*, *clair obscure*, *expression*, &c.

The principal rules of designing are,

I. That

## D E S

1. That young beginners accustom themselves to copy after good originals at first sight, not to use squares in drawing for fear of stinting and confining their judgment.

2. To stay till they can *Design* well after the *life*, before they begin the practice of perspective rules.

3. In *designing* after the *life*, to learn to adjust the bigness of their figures to the visual angle, and the distance of the eye from the model or object.

4. To mark out all the parts of their *Design*, before they begin to shadow.

5. To make their contours in great pieces, without taking notice of the little muscles and other breaks.

6. To make themselves masters of the rules of perspective.

7. To observe every stroke as to its perpendicular parallel and distance, and particularly so to compare and oppose the parts, which meet upon and traverse the perpendicular, so as to form a kind of square in the mind; which is the great, and almost the only rule of *designing* justly.

8. To have a regard not only to the model, but also to the part already *design'd*, there not being any such thing as *designing* with strict justness; but by comparing and proportioning every part to the first:

The rest have a relation to perspective, as

1. That those objects whose rays meet in a point are seen at one view.

2. That the eye and object be always conceiv'd as immovable.

3. That the space or *medium* between, be conceiv'd to be transparent.

4. That the eye, object and picture be at a just distance, which is usually double the bigness of the subject or picture.

DESIGNING, is the art delineating or drawing the appearance of natural objects by lines on a plane.

To *Design* according to the rules of mathematicks, makes the subject of perspective. See PERSPECTIVE.

To *Design* by the *camera obscura*. See CAMERA OBSCURA.

*A mechanical method of DESIGNING objects.* Provide a square piece of glass fitted into a frame A B C D, (tab. persp. fig. 9.)

And wash or smear it over with water, wherein a little gum has been dissolv'd.

And when it is well dry'd again, turn it towards the object or objects to be *design'd*, so as that the whole thereof may be seen through a *dioptra* or sight G H, fixt thereto.

Then

## D E S

Then proceed to the work, and applying the eye to the sight, with a pen and ink, draw every thing on the glass as you see it appear thereon.

Having finish'd the draught, lay a fair moist paper thereon, and pressing it pretty hard down, the whole will be transferr'd from the glass to the paper.

This method is very easy and exact, and deserves to be more us'd by painters. See the *Machine*.

DESIGNING is represented in painting, &c. by a stripling of a noble aspect, with a garment of rich cloth, holding compasses in one hand, and a mirror in the other.

His aspect shews, that all things made by art more or less handsome, according to the more or less *Designing*; the compasses, that *Designing* consists in measuring, the glass denotes, that a good imagination is requisite.

DESIRE is an agitation of the soul, caus'd by the spirits which dispose it to the desire of those things, which seem agreeable to it, so we desire not only the presence of an absent good; but the preservation of the present.

*Desire* has this peculiar to it, that it agitates the heart more violently than any other of the passions, and furnishes more spirits to the brain; which pass from thence into the muscles, and render all the senses more acute, and all the parts of the body more active.

If *love* be join'd to *desire*, that may be represented in drawing, painting and statuary, by the eye-brows press'd (or close together) and advanced or forwards towards the eyes, which will be more open than ordinary, with the eye-ball in the middle inflam'd or full of fire; the nostrils rise up and are contracted or drawn closest towards the eyes, the mouth half open, the corners drawn back, and the tongue may appear upon the edge of the lips, the colour more inflam'd than in *love*, all these motions shewing the agitation of the soul caus'd by the spirits, which being in motion and disposing it to *Desire* a good represented as convenient for it, give a lively glowing colour.

*Desire* may also be express'd by the arms being extended towards the object desir'd, and the whole body inclining the same way; and all the parts appearing in an unquiet and wavering motion.

DESPAIR, is an opinion of the impossibility to obtain what we desire, and makes us lose even what we possess.

*Extreme Despair* may be express'd in drawing, painting and statuary, by a man grinding his teeth, foaming and biting his lips, his forehead furrowed with wrinkles from the top to the bottom, the eye-brows drawn downwards over the eyes, and pressing one another on the sides of the nose; the eyes seeming fiery  
and

## D E S

and full of blood, the eye-ball disturb'd or wandering, and hid under the eye-brow, the lower-part of the eye will seem sparkling and unsteady, the eyelids swell'd and livid; the nostrils large, open and rising upwards, the end of the nose sinking down; the muscles, tendons and veins of these parts being very much swell'd and stretch'd, as also all the veins and nerves of the forehead, temples, and the fore-parts of the visage; the upper part of the cheeks will appear large, but scored and drawn in about the jaws; the mouth being drawn backwards, is more open at the sides or corners than the middle; the under lip is large and turn'd out, the lips are pale as is the rest of the face, and the hair staring and standing upright.

In *Despair* all the parts of the body are almost in the same state as in *anger*, but they should appear more disorder'd; for you may express one in this condition, tearing off his hair, biting and tearing his flesh, or running and precipitating himself.

DESPISING PLEASURE is represented in painting, &c. by a man armed with a garland of laurel; going to fight, a serpent and a stork by his side; at his feet many serpents, which the stork fights with beak and claws.

Armed because the despising those things requires magnanimity, the stork fighting against the *Pleasures* of the world; and earthly thoughts are intimated by the serpent, always creeping on the earth.

DESPISING *the* WORLD is represented in painting, &c. by a man armed, a palm branch in one hand, and a spear in the other; turning his head aside towards heaven, he tramples upon a crown, which signifies his undervaluing riches and honours. His head denotes, that such dis-esteem proceeds from sanctified thoughts of God, his being armed intimates, that he attained not such perfection without fighting.

DESTINIES, are the three sisters which the *Latins* call *Parcæ*, named *Clotho*, *Lachesis* and *Atropos*.

*Clotho* is feign'd to have the charge of the births and nati-  
vities of mortals; *Lachesis* of all the rest of their life, and *Atropos* of their death or departure out of the world.

They are all three represented in painting, &c. sitting on a row, very busily employ'd in their several offices, the youngest sister drawing out of a distaff a thread of a reasonable bigness, the second winding it about a wheel, and turning the same, till it becomes little and slender; the eldest (which is aged and decrepit) stands ready with a knife or shears to cut it off, when spun.

They are also painted in white veils, and little coronets on their heads wreathed about with garlands of flowers of *narcissus*.

## D E V

DESTINY, was also represented as a lady in a great rage & fury, and of exceeding celerity, holding in her hand an iron bow, ready bent, aiming to strike *fortune* even at the very heart.

DETRACTION is represented in painting, &c. by a woman sitting, lolling out her tongue, a black cloth over her head; her garment torn and rusty coloured, spread here and there with tongues, a cord about her neck instead of a bracelet, in her right hand she holds a dagger as if she would stab.

Her sitting denotes idleness, the main cause of *Detraction*, her mouth open, proneness to *Detraction*, and back-biting, the rusty coloured garment, that as rust corrodes iron, so does *Detraction* the good name and reputation, the rope the abject condition of back-biters.

DEVICE, is an emblem or representation of some natural body, with a motto or sentence apply'd in a figurative sense, to the advantage of some person, and the figure or image is call'd the body, and the motto the soul of the *Device*.

A *Device* is a sort of a metaphor, representing one object by another, wherewith it has some resemblance.

So that a *Device* is only true, when it contains a metaphorical similitude, and may itself be reduc'd into a comparison.

Lastly, a *Devise* is a metaphor painted and visible, and that strikes the eye.

All these circumstances are requisite to a *Device*, and without them a figure only makes a hieroglyphick, and the word only a diction or sentence.

Fa. *Bohours* gives a clear and accurate explication of the word *Device*. A *Device* says he, is a composition or assemblage of figures drawn from nature and art, call'd the *body*, and of a few words adapted to the figure, and call'd the *soul*.

Such a compound we make use of to denote our thoughts or intentions by comparison; for the essence of a *Device* consists in a comparison, taken from nature or art, and founded on a metaphor.

This he illustrates, in the following instance; a young nobleman of great courage and ambition, bore for his *Device* in the last carraussol at the court of *France*, a rocket mounted in the air with this motto in *Italian*, *poco duri purche m'inalzi*, i. e. I would last little, provided I might rise high, which seems to hold forth the following discourse; as the rocket rises to a great pitch, though it only endures a little while; so I am not concern'd about living long, provided I attain to glory and eminence, which is a just comparison.

Upon this foundation a *Device* is a painted metaphor, or rather an enigma inverted, for whereas enigma's represent nature



or art, by the events of history, and the adventures of fables; a *Device* is a representation of human qualities, by natural or artificial bodies. The *French* have distinguish'd themselves in this way, especially since the time of Cardinal *Mazarine*, who had a wonderful fancy for them.

The *Italians* have reduc'd the making *Devices* into an art, and laid down laws and rules for it. Some of the principal are,

1. That there be nothing monstrous or extravagant in the figures, nothing contrary to the nature of things, or the common opinion of mankind.

2. That figures be not join'd, that have no affinity or relation to each other, the metaphor being to be founded upon something real, and not on hazard or imagination; excepting some whimsical unions establish'd in fables, which custom and the authority of the poets have made pass for natural.

3. That the human body be never taken into *Devices*.

4. That there be a sort of unity in the figures, that make the body, it is not meant, that there must be only a simple figure; but that if there be several, they have a relation and subordination to each other; so that there be one principal figure on which the rest depend.

5. Though still the fewer figures there are in the body of the *Device*, and the less they are confus'd, the more perfect and elegant is the *Device*.

5. The motto which is to animate the figure must agree so accurately thereto, as that it could not serve for any other.

6. Nothing to be nam'd that appears to the eye, and which the bare inspection may make known.

7. The motto not to have a complete sense of itself, for being to make a compound with the figure, it must only be a part, and consequently must not signify the whole. If the words alone have a complete signification, you have a full and distinct notion independently of the figure; whereas the signification should result from both.

8. The shorter the motto, the more beautiful; and a suspension of the sense which leaves something to guess, is one of the principal graces of the *Device*.

9. And lastly, it is accounted a happiness in a *Device*, where the words of a poet are apply'd in a sense he never dream'd of, and yet so pertinently, that it should seem, that they had been intended for the same.

D. F. stands for *Domenichino* of *Florence*.

D. H. stands for *David Hepfer*, the brother of *Lambert* and of *Jerome*, all three *German* engravers.

## D I A

DIAGLYPHICE, is the art of engraving, cutting or otherwise working hollow or concave figures in metals; such as seals, intaglia's, the matrices or coins for medals, &c.

### DIALLING.

*The description of the* CLINATORY *or* DECLINATORY.

The declinatory is made of a square board, as A B C D in the figure, of a good thickness, and the larger the better, between two of the sides is describ'd on the centre A a *quadrant*, as E F divided into ninety equal parts or degrees, which are figured with 10, 20, 30 to 90; and then back again with the complements of the same numbers to 90; between the limb and the two semi-diameters, is made a round box into which a magnetical needle is fitted, and a card of the nautical compass, divided into nineties, beginning their numbers at the east, west, north and south points of the compass; from which points the opposite sides of the clinatory receive their names of east, west, north and south. See plate 1. fig. 1.

But note, that the north point of the card must be placed so many degrees towards the east or west sides of the clinatory, as the needle varies from the true north points of the world, in the place where you make the *Dial*, which the workman who makes the clinatory will know how to fit.

Upon the center, A, whereon the *quadrant* is describ'd, is fastened a plumb-line, having a plummet of lead or brass, fastened to the end of it, which plumb-line is of such length, that the plummet may fall just into the groove G H, below the *quadrant*, which is for that purpose made of such a depth, that the plummet may ride freely within it, without stopping at the sides of it. See the figure annex'd.

With this clinatory you may examine the situation of planes, as if your plane be horizontal, it is direct; and then for the true situating your *Dial*, you have only the true north and south line to find; which is done only by setting the clinatory flat down upon the plane, and turning it towards the right or left hand, till you can bring the north point of the needle to hang just over the *flower de luce*; for then if you draw a line by either of the sides, parallel to the needle, that line shall be the north and south line.

If your plane, either recline or incline, apply one of the sides of the clinatory, parallel to one of the semi-diameters of the *quadrant* to the plane in such a manner, that the plumb-line hanging at liberty, may fall upon the circumference of the *quadrant*; for then the number of degrees of the *quadrant*, comprehended between the side of the *quadrant*, parallel to the plane, and the plumb-line shall be the number of degrees for

Fig. 1.

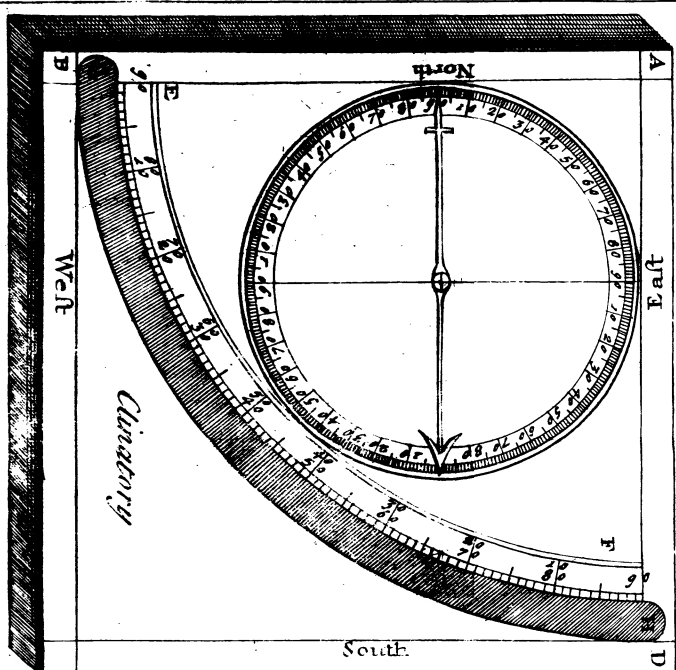


Fig. 2.

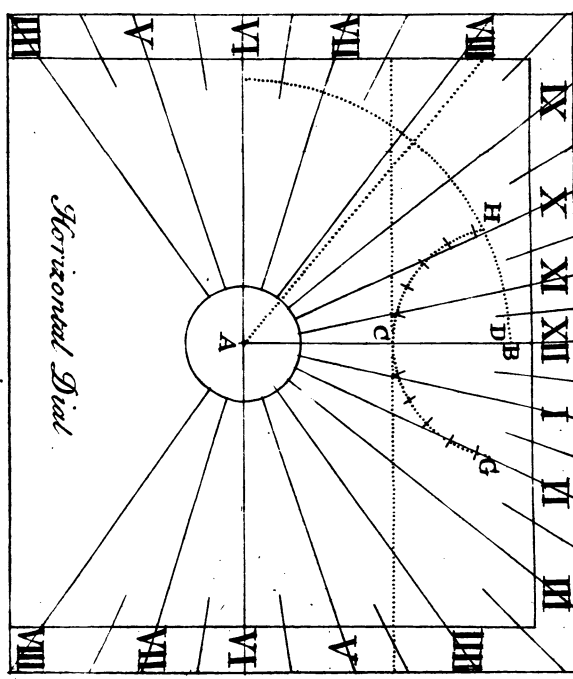


Fig. 4.

An Erect North or South dial declining Eastward or Westward

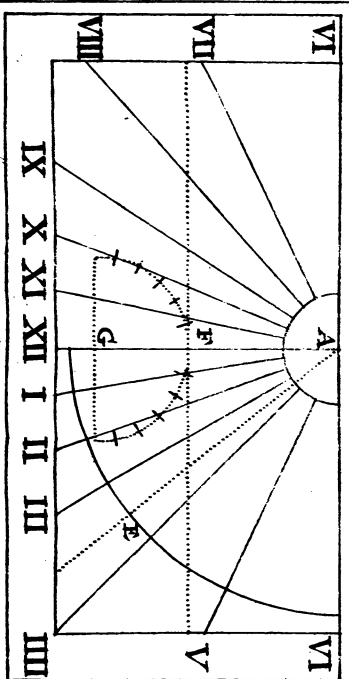
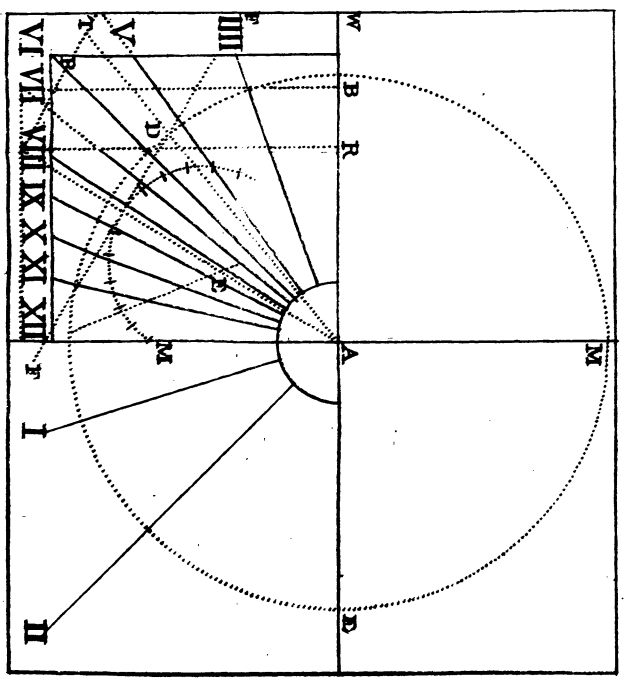


Fig. 5.

An erect South Dial





## D I A

for *reclination*, if the center of the *quadrant* points upward; or *inclination* if the center points downwards.

If your *reclining* or *inclining* plane decline, draw upon it a line parallel to the horizon, which you may do by applying the back-side of the *clinatory*, and raising or depressing the centre of the *quadrant*, till the plumb-line hang upon one of the semi-diameters; for then you must by the upper-side of the *clinatory*, draw an horizontal line if the plane *incline*, or by the under-side if it *recline*.

If it neither *incline* nor *recline*, you may draw a horizontal line both by the upper and under sides of the *clinatory*.

Having drawn the horizontal line, apply the north side of the *clinatory* to it, and if the north end of the needle points directly towards the plane, it is then a *south plane*; if the *north* point of the needle point directly from the plane, it is a *north plane*; but if it point directly towards the *east*, it is an *east plane*; if towards the *west*, a *west plane*.

If it do not point directly either *east*, *west*, *north*, or *south*, then so many degrees is the declination of the plane.

You may find a meridian line another way, thus; if the sun shine just at noon, hold up a plumb line, so that the shadow of it may fall upon your plane, and that shadow shall be your *meridian line*.

*To describe a DIAL upon a HORIZONTAL plane.*

First draw a north and south line (which is call'd a *meridian line*) through the middle of the plane, thus; set your *declinatory* flat upon the plane, and turn it to and fro till the needle hang precisely over the *meridian line* of the *declinatory*; then by the side of the *declinatory*, parallel to its *meridian line*, draw a strait line on the plane, and if that strait line be in the middle of the plane, it shall be a *meridian line* without any more to do. See plate 1. fig. 2.

But if it be not in the middle of the plane, you must draw a line parallel to it, through the middle of the plane, for the *meridian line*, or XII a clock line, and it shall be the *meridian line*, and also the *substilar line*; then draw another strait line through the middle of this line, to cut it at right angles, for the VI a clock lines; and where these two lines cut one another, make your center, whereon describe a circle on your *plane*, as large as you can, which by the *meridian line*, and the line drawn at right angles with it, will be divided into four *quadrants*; one of the *quadrants* divide into ninety degrees, thus, keeping your compasses at the same width they were at, when you describ'd the *quadrant*; place one foot in the XII a clock line, and extend the other in the *quadrant*, and make in the

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Quadrant a mark with it; so you will have the sixtieth degree mark'd out; then place one foot of your compasses in the VI a clock line, and extend the other in the *quadrant*, and make in the quadrant another mark with it; and so will that quadrant be divided into three equal parts, each of these three equal parts contains thirty degrees: then with your compasses divide one of these three equal parts into three parts, and transfer that distance to the other two third parts of the quadrant, so shall the whole *quadrant* be divided into nine equal parts.

Then divide one of these nine equal parts into two equal parts, and transfer that distance to the other eight equal parts, and so shall the *quadrant* be divided into eighteen equal parts.

Then divide one of these eighteen equal parts into five equal parts, and transfer that distance to the other seventeen equal parts, and so will the whole *quadrant* be divided into ninety equal parts. Each of these ninety equal parts are call'd degrees.

*Note*, That you may in small *quadrants*, divide truer and with less trouble with steel dividers (which open or close with a screw for that purpose) than you can with compasses.

In this *quadrant* (thus divided) count from the substilar or *meridian-line*, the elevation of the pole, that is, the number of degrees that the *pole* of the world is elevated above the *horizon* of your place, and draw a line from the center through that number of degrees for the *stilar line*.

Then on the *substilar line* chuse a point (where you please) and through that point draw a line at right angles to the *substilar line*, as long as you can, for the line of *contingence*; and from that point in the *substilar line*, measure the nearest distance that any part of the stilar line hath to that point; and keeping one foot of your compasses still in that point, set off that distance in the *substilar line*, and at that distance describe against the line of contingence a semi-circle, which divide from either side the *meridian* or *substilar line* into six equal parts thus: draw a line through the center of this semi-circle, parallel to the *line of contingence*, which shall be the *diametral line*, and will divide this semi-circle into two *quadrants*; one on one side the *substilar line*, and the other *quadrant* on the other side the *substilar line*.

Then keeping your compasses at the same distance they were at, when you described the semi-circle, place one foot first on one side of the *diametral line*, at the intersection of it and the semi-circle, and then on the other side at the intersection of it and the semi-circle, and extend the other in the semi circle, and make marks in the semi-circle on either side the *substilar line*.

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Then place one foot of your compasses at the intersection of the *semi-circle* and the *substilar line*, and turn the other foot about on either side the semi-circle, and make marks on the semi-circle ; and so will the semi-circle be divided into six equal parts.

Divide one of these equal parts into two equal parts and transfer that distance to the other five equal parts, so shall the whole semi-circle be divided into twelve equal parts.

These twelve divisions are to describe the twelve hours of the day, between VI a clock in the morning, and VI a clock in the evening.

If you will have half hours, you may divide each of these twelve into two equal parts, as before : if you will have quarters, you may divide each of these twenty-four into two equal parts more as before.

For thus proportioning the divisions in the semi-circle, you may proportion the divisions and sub-divisions of hours upon *dial planes* ; for a strait ruler laid upon each of these divisions, and on the centre of the semi-circle, will shew on the *line of contingence*, the several distances of all the hours and parts of hours on the *dial plane* ; and strait lines drawn from the centre of the *dial plane*, through the several divisions on the *line of contingence*, shall be the several hour lines, and parts on the *dial plane*.

But an *horizontal Dial* in our latitude will admit of four hours more, *viz.* V VI in the morning, and VII VIII in the evening.

Therefore in the circle describ'd on the *dial plane*, transfer the distance between VI and V, and VI and IV on the other side the VI a clock line ; and transfer the distances between VI and VII, and VI and VIII on the other side the opposite VI a clock hour line, and from the center of the dial plane, draw lines through those transferr'd distances for the hour lines before and after VI.

Then mark your hour lines with their respective numbers, the *substilar-line* in this *Dial* (as aforesaid) is XII ; from thence towards the right hand, mark every successive hour line with I II III, &c. and from XII towards the left hand with XI X IX, &c.

The stile must be erected perpendicularly over the *substilar line*, so as to make an angle with the *dial plane*, equal to the elevation of the pole of your place.

*Example.*

Suppose you would draw a *Dial* upon a *horizontal plane* here at London ; first draw the *meridian* (or north and south line) as XII B, and cross it in the middle with another line at right



angles, as VI VI, which is an east and west line. Where these two lines cut each other as at A, make the centre, whereon describe the semi-circle B VI VI; but one of the *quadrants*, viz. the *quadrant* from XII to VI towards the right hand, you must divide into ninety equal parts (as you were taught before) and make at 51 1/2 degrees (which is the latitude of London) a mark, and laying a strait ruler to the centre of the plane, and to this mark draw a line by the side of it for the *stilar line*.

Then on the *substilar line*, chuse a point as at C, and thro' that point draw a line as long as you can perpendicularly to the east and west line VI VI as EF (which is call'd the *line of contingence*, or *contingent line*) and where this *line of contingence* cuts the *substilar line*, place one foot of your compasses, and from thence measure the shortest distance between the point C and the *stilar line* on the *substilar line*, as at D; which point D shall be the centre, whereon with your compasses at the same width, you must describe a semi-circle to represent a semi-circle of the *equinoctial*.

Divide this semi-circle into six equal parts, to each of which equal parts, and to the centre of the *equinoctial* semi-circle lay a strait ruler, and where the strait ruler cuts the *line of contingence*, make marks in the line of *contingence*.

Then lay a strait ruler to the semi-circle of the *dial plane* and to each of the marks in the *line of contingence*, and by the side of it draw twelve strait lines for the twelve fore and afternoon hour lines, viz. from VI in the morning, to VI in the evening.

Then in the *quadrant* VI B measure the distance between the VI a clock hour line, and the V a clock hour line, and transfer the same distance from the VI a clock line to VII and V on both sides the VI a clock hour line; and through those distances draw from the center of the plane the VII and V a clock hour lines, and measure the distance between the VI a clock hour line and the IV a clock hour line, and transfer the same distance from the VI a clock line to VIII and IV, and through those distances draw from the centre of the plane the VIII a clock and IV a clock hour lines. See plate 1. fig. 2.

If you will have the half hours and quarters, or any other division of hours, you must divide each six divisions of the *equinoctial* into so many parts as you intend, and by a strait ruler laid to the center of the *equinoctial*, and those divisions in the *equinoctial* circle make marks in the *line of contingence*, as you did before for the whole hour lines; and lines drawn from the center of the plane through those marks, shall be the sub-divisions of the hours. But you must remember to make all the sub-

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subdivisions short lines, and near the verge of the *dial plane*, that the hours and the parts of the hours may the more easily be distinguished, as you see in the figure.

Having drawn the hour lines, set the number of each hour line under it, as you see in the figure.

Last of all, fit a triangular iron, whose angular point being laid to the center of the *dial plane*, one side must agree with the *substilar line*, and its other side with the *stilar line*, and so is the *stile* made.

And this stile must be erected perpendicularly over the *substilar line* on the dial plane, and there fix it; then is your *Dial* finish'd.

### *To describe an* ERECT DIRECT SOUTH DIAL.

You may know an *erect direct south plane*, by applying the north side of the *declinatory* to it; for then, if the north end of the needle hang directly over the north point of the card in the bottom of the box, it is a south plane; but if it hang not directly over the north point of the card, it is not a *direct south plane*; but declines either *east* or *west*, and that contrary to the pointing of the needle *easterly* or *westerly*, from the north point of the card; for if the north point of the needle points *easterly*, the *plane* declines from the south towards the *west*; if it points *westerly*, the *plane* declines from the *south* towards the *east*.

You may know if the *plane* be truly *erect* or upright, by applying one of the sides A B or A D to it; for then, by holding the centre A upwards, so that the plumb line may play free in the groove, if the line falls upon 0, or 90, the plane is upright; but if it hang upon any of the intermediate degrees, it is not upright, but either inclines or reclines.

If you find that it inclines, apply the side A B to it, and see what number of degrees the plumb-line falls on; for that number of degrees, counted from the side A B, is the number of degrees of *inclination*.

If you find that the plane *reclines*, apply the side A D to it, and see what number of degrees the plumb line falls on; for that number of degrees, counted from the side A D, is the number of degrees of *reclination*.

These rules being well understood, may serve for the finding the situation of all other planes.

But in order to make a *Dial* on this *plane*, you must first draw a *meridian line* through the middle of the plane, by applying a plumb line to the middle of it, till the plummet hang quietly before it; for then, if the plumb-line be black'd (for a white ground) or chalk'd (for a dark ground) and strain'd as carpenters do their lines, you may with one stroke of the string

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string on the *plane* describe the *meridian line*, as A XII in plate 1. fig. 3.

Then on the top of this *meridian line*, as at A, draw another line athwart it, to cut it at right angles, as VI VI, for an *east* and *west* line.

At the meeting of these two lines at the top, make your centre, on which describe a semi-circle on your plane, as large as you can, which by the *meridian line*, and the *east* and *west* line, will be divided into two quadrants.

One of these *quadrants* divide into ninety degrees (as is before taught) and from the substilar line, count the compliment of the *elevation of the pole*, which (here at *London*, where the pole is elevated  $51\frac{1}{2}$  degrees) its complement to 90 is  $38\frac{1}{2}$  degrees, and there make a mark as at E.

Then on the *substilar-line* chuse a point (where you please) as at F for the *line of contingency* to pass through; which line of contingency draw as long as you can, so that it may cut the *substilar line* at right angles; and from the point F in the *substilar line*, measure the shortest distance between it and the *stilar line*; and keeping one foot of your compasses still in the point F, transfer that distance into the *substilar line*, as at G; then on the point G describe a semi-circle of the equinoctial against the *line of contingency*, which semi-circle divide into twelve equal parts (as is taught in the example of the *horizontal dial*) and by a strait ruler laid to each of these divisions, and to the centre of the semi-circle, make marks in the *line of contingency* by the side of the ruler; for strait lines drawn from the center of the *dial plane*, through these marks in the *contingent line*, will be the twelve hour lines before and after noon.

Then mark your hour lines with their respective numbers; the *substilar* or *meridian line* is XII, from thence towards the right hand with I, II, III, &c. and from thence towards the left hand with XI, X, IX, &c.

The stile must be erected perpendicularly over the substilar line, so as to make an angle on the *dial plane* equal to the complement of the *elevation of the pole*, viz.  $38\frac{1}{2}$  degrees.

*To make an ERECT DIRECT NORTH DIAL.*

The *erect direct north Dial*, stile and all, is made by the same rules, changing upwards for downwards, and the left side for the right, that the *erect direct south dial* is made.

For if the *erect direct south Dial* be drawn on any transparent plane, as on glass, horn, or an oiled paper, and the horizontal line VI VI turned downwards, and the line VII mark'd with V, and the line VIII with IIII, and the line V with VII, and the line IIII with VIII; then you will have of it a *north erect dial*.

## D I A

All the other hour lines in this *Dial* are useless, because the sun in our *latitude* shines on a north face the longest day, only before VI in the morning and after VI in the evening.

*To describe an ERECT DIRECT EAST DIAL.*

Hang a plumb line a little above the place on the wall, where you intend to make your Dial, and wait till it hang quietly before the wall; then, if the line be rubbed with chalk (as the carpenters do) you may, by holding the end of the plummet line close to the wall, and straining it pretty stiff, strike with it a strait line, as carpenters do; this line will be a perpendicular, as A B. See plate 2. fig. 1.

Then chuse a convenient point in this perpendicular as at C, for a center, whereon describe an occult arch, as at D E; this arch must contain the number of degrees of the *elevation of the equinoctial*, counted between D and E, which in our latitude is  $38\frac{1}{2}$  or (which is all one) the complement of the *elevation of the pole*.

Therefore in a quadrant of the same *radius*, with the occult arch, measure  $38\frac{1}{2}$  degrees, and set them off in the plane from E to D; then from D to the center C in the perpendicular draw the prickt line D C; and this prickt line will represent the axis of the world.

Then cross this line at right angles with the line C F, and draw it off from C to F, as long as you possibly can, and this line will be the *contingent line*.

Then chuse a point in this *contingent line* as at VI, and draw a line through that point at right angles for the *substilar line*, as G VI H for the *substilar line*; then open your compasses to a convenient width as to (VI G) and pitching one foot in the point G, with the other foot describe a semi-circle of the equinoctial against the *line of contingence*, which semi-circle divide from VI both ways into six equal parts, as you were taught by the *example* in the *horizontal Dial*; and laying a strait ruler on the centre of this semi-circle of the *equinoctial*, and to each of those equal parts, mark on the contingent line, where the ruler cuts it; for those marks shall be the several points, from whence lines drawn parallel to the line C D, shall be the respective hour lines. See plate 2. fig. 1.

The reason why the *contingent line* is drawn from VI to F so much longer than from VI to C, is because the hour lines from VI to XII are more in number towards noon, than they are from VI backwards towards IV; for this Dial will only shew the hours from a little before IV in the morning to almost noon; for just at noon, the shadow goes off the plane, as may be seen by applying a strait ruler to the center of the equinoctial semi-circle G, and lay it to the point XII in the semi-circle; for then the strait ruler will never cut the *line of contingence*, be-  
cause

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cause the *line of contingence* is parallel to the line G XII on the equinoctial circle; and lines parallel, tho' continued to never so great a length, never meet.

To these hour lines put figures, as you see plate 2 fig. 1.

The stile IK of this Dial, as well as of all others, must stand parallel to the *axis of the world*; and also parallel to the face of the *plane*, and parallel to all the hour lines, and stand directly over the *substilar* or VI a clock hour line, and that so high, as is the distance of the centre of the *equinoctial* semi-circle from the *contingent line*.

To describe a DIAL on an ERECT DIRECT west plane.

An *erect direct west Dial* is the same in all respects with an *erect direct east Dial*, only as the east Dial shews the forenoon hours, so the west shews the afternoon hours.

Thus if the east Dial were drawn on any transparent plane, as on glass, horn, or oil'd paper, on the one side will appear an *east Dial*, and on the other side a west; only the numbers to the *hour lines* (as was said before as to the *north Dial*) must be changed; for that which in the east Dial is XI, in the west must be I; that which in the east Dial is X, in the west must be II; that which in the east Dial is IX, in the west must be III, &c. The stile is the same.

To describe a DIAL on an ERECT north or south plane, DECLINING eastward or westward. Plate 1. fig. 4.

These four Dials, viz. the *erect north declining eastward*, the *erect north declining westward*, the *erect south declining eastward*, and the *erect south declining westward*, are all projected by the same rules; and therefore are in effect but one Dial, differently plac'd, as you will see hereafter.

First, draw on your *plane* a strait line, to represent the horizon of your place, and mark one end of it W, for *west*, and the other end E for *east*.

Then chuse a point in this horizontal line for a centre as at A, on which you may describe a circle, to comprehend all these four Dials; draw a line as M, A, M, perpendicular to the *horizontal line* W E through the centre A for a *meridian line*, and on that centre describe a circle, which by the two lines W, A, E, and M, A, M, will be divided into four *quadrants*, which will comprehend the four Dials aforesaid; for if it be a *north declining west* you are to draw, the upper *quadrant* on the left hand serves your purpose; if a *south declining west*, the same lines continued through the center A into the lower *quadrant* to the right hand serves your turn; if a *north declining east*, the upper *quadrant* to the right hand serves your turn; or if a *south declining east*, the same lines continued through the centre A into the lower *quadrant* to the left hand, serves your turn; and you must

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must draw the *declination complement of the poles, altitude, substile, stile, and hour lines* in it; but the hour lines must be differently mark'd, as you will see hereafter.

I shall only give you an example of one of these *Dials*, viz. a *south declining east*.

We will suppose you are to draw a *Dial* that declines from the *south*, 50 degrees towards the *east*; here being but one *Dial*, you need describe but one *quadrant* of a circle. Plate 1. fig. 4.

Set off in the lower *quadrant* W, A, M, 50 degrees from the *meridian line*, M towards W, and from the centre A draw a strait line, through that mark in the *quadrant*, as D, A, which may be call'd the line of declination; then set off from the *meridian line* the *complement of the pole's elevation*, which in our latitude is  $38\frac{1}{2}$  degrees, and there draw another line from the centre to A P, which we will call the *polar line*.

Then take in the *horizontal line* a convenient portion of the *quadrant*, as A B, and from the point B draw a line parallel to the *meridian line* A M, and continue that line till it intersect the *polar line* as at P, from which point P draw a line parallel to W A as P C; then measure the distance of A B in the *horizontal line*, and set off that distance in the line of declination, as from A to D, and from that point of distance draw a line parallel to the *meridian* A M, through the *horizontal line* at R, and through the point D, and continue it through the line P C as at S, then laying a strait ruler to the center A, and the intersection of the line P at S, draw the line A S for the *substile*.

Then upon the point S erect a line perpendicularly as S T; then measure the distance between R and D, and set that distance off from S to T; and from the centre to the point T draw the line A T for the *stile* or *Gnomon*; and the triangle S A T made of iron or brass, and erected perpendicularly over the *substile* S A, shall by its upper side T A, cast a shadow upon the hour of the day.

But you will say the hour lines must be drawn first, it is true; therefore to draw them you must chuse a point in the *substile line*, where you think good, and through it draw the line F F as long as you can for the *line of contingency*; then with your compasses take the shortest distance between this point and the *stile*, and transfer that distance below the *line of contingency* on the *substile* as at Æ or A E, and with your compasses at that distance describe on the centre Æ a circle to represent the *equinoctial*; then (as you were taught in the example of the *horizontal dial*) divide the semi-circle of the *equinoctial* into twelve equal parts, beginning at the point in the *equinoctial circle*, where a strait line drawn from the centre of it to the intersection of the *line of contingency* with the *meridian line*, cuts the *equinoctial line*,



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*line*, as here at the point G; then lay a strait ruler to the centre of the *equinoctial circle*, and to every one of the divisions in the semicircle, and mark where the strait ruler cuts the *contingent line*; for strait lines drawn from the centre A of the *Dial*, to those several marks on the *contingent line* shall be the *hour lines*; and must be numbred from the *noon line* or *meridian* A M, backwards as XII XI X IX, &c. towards the left hand, so is your *Dial* finish'd.

This *Dial* drawn on any transparent matter, as glass, horn or oiled paper, shall on the other side the transparent matter become a *south declining west* (stile and all) but then the I a clock hour line must be mark'd II, the XII XII, the XI a clock hour line I, X, II, IX, III, &c.

If you project it anew, you must describe the *quadrant* M W, on the other side the *meridian line*, on the centre A from M to E, and then count (as before) the *declination*, *altitude* of the *poles*, *substile* and *stile* in the *quadrant*, beginning at M towards E, and work in all respects as in the *south declining east*; only number this *south declining west*, as in the foregoing paragraph.

If you project a *north declining east*, you must describe the *quadrant* above the *horizontal line*, from M upwards towards E on your right hand, and count (as before) the *declination*, *altitude*, *complement* of *pole*, *substile* and *stile* from the *meridian line*, and work as with the *south declining east*; it must be numbred from the *meridian line* M, towards the right hand with XI X IX VIII, &c.

If this *Dial* were drawn on a transparent matter, the other side would shew a *north declining west*, but if you will project it anew, you must describe the *quadrant* above the *horizontal line*, from M upwards towards W, and count from the *meridian line* A M, the *declination*, *complement*, *altitude* of the *pole*, *substile* and *stile*, and work with them in all respects, as with the *south declining east*; but then the XI a clock hour line must be mark'd I, the X, II, the IX, III, &c.

To make a DIAL on the CIELING of a room, where  
the direct beams of the sun never come.

Find some convenient place in the transum of a window, to place a small round piece of looking-glass about the bigness of a groat, or less so as it may lie exactly horizontal.

The point in the middle of this glass we will mark A, and for distinction sake will call it *nodus*. See plate 2. fig. 2.

Through this *nodus* you must draw a *meridian line* on the floor, thus hang a plumb-line in the window exactly over the *nodus*, and the shadow that the plumb-line casts on the floor just at noon will be a *meridian line*; or you may find a *meridian line* otherwise by the *clinatory*.

Having



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Having drawn the *meridian line* on the floor, find a *meridian line* on the ceiling, thus; hold a plumb-line to the ceiling, over that end of the *meridian line* next the window; if the plummet hang not exactly on the *meridian line* on the floor, remove your hand on the ceiling one way or other, as you see cause, till it do hang quietly just over it, and at the point where the plumb-line touches the ceiling, make a mark, as at B; that mark B shall be directly over the *meridian line* on the floor. Then remove your plumb-line to the other end of the *meridian line* on the floor, and find a point on the ceiling directly over it, as you did the former point, as at C, and through these two points B and C on the ceiling strain and strike a line black'd with small coal or any other colour (as carpenters do); and that line B C on the ceiling shall be the *meridian line*, as well as that on the floor.

Then fasten a string just on the *nodus*, and remove that string forwards or backwards in the *meridian line* on the ceiling, till it has the same elevation in the *quadrant* on the *clinatory* above the *horizon*, that the *equinoctial* has in your habitation, and thro' the point where the string touches the *meridian line* on the ceiling, shall a line be drawn at right angles with the *meridian* to represent the *equinoctial line*.

Thus in our latitude the elevation of the equator being  $38\frac{1}{2}$  degrees; I remove the string fastened to the *nodus* forwards or backwards in the *meridian line* of the ceiling, till the plumb-line of the *quadrant* on the *clinatory*, when one of the sides are apply'd to the string, fall upon  $38\frac{1}{2}$  degrees; and then I find it touch the *meridian line* at D in the ceiling, therefore at D I make a mark, and through this mark strike the line D E (as before I did in the *meridian line*) to cut the *meridian line* at right angles; this line shall be the *equinoctial line*, and serve to denote the hour distances, as the *contingent* line does on other *Dials*, as you have often seen.

Then I place the center of the *quadrant* on the *clinatory* upon the *nodus*; so as the arch of the *quadrant* may be on the *east* part of the *meridian line*, and under-prop it so, that the flat side of the *quadrant* may lie parallel to the string, when it is strained between the *nodus* and the *equinoctial*; and also so as the string may lie on the semi-diameter of the *quadrant*, when it is held up to the *meridian line* on the ceiling.

Then removing the string the space of 15 degrees in the *quadrant*, and extending it to the equator on the ceiling, where the string touches the equator, there shall be a point through which the I a clock hour line shall be drawn; and removing the string yet 15 degrees further to the eastward in the semi-circle of position, and extending it also to the *equator*, where it touches the *equator*, there shall be a point through which the II a clock hour

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hour line shall be drawn, removing the string yet 15 degrees further to the eastward in the semi-circle of position, and extending it to the *equator*; there shall be a point through which the III a clock hour line shall be drawn.

The like is to be done for all the other afternoon hours. So oft as the string is remov'd through 15 degrees on the *quadrant*, so oft will it point out the afternoon distances in the *meridian line* on the cieling.

Having thus found out the points in the *equator*, through which the afternoon hour lines are to be drawn, you may find the forenoon hour distances also, the same way, *viz.* by removing the arch of the *quadrant* to the west side the *meridian*, as before it was plac'd on the *east*, and bringing the string to the several 15 degrees on the *west* side the *quadrant*; or otherwise, you need only to measure the distances of each hour's distance, found in the *equator* from the *meridian line* on the cieling; for the same number of hours from XII, have the same distance in the *equinoctial line* on the other side the *meridian*, both before and afternoon.

The XI a clock Hour distance is the same from the *meridian line*, with the I a clock distance on the other side the *meridian*; the X a clock distance the same with the II a clock distance; the IX with the III, &c. and thus the distances of all the hour lines are found out on the *equator*. See plate 2. fig. 2.

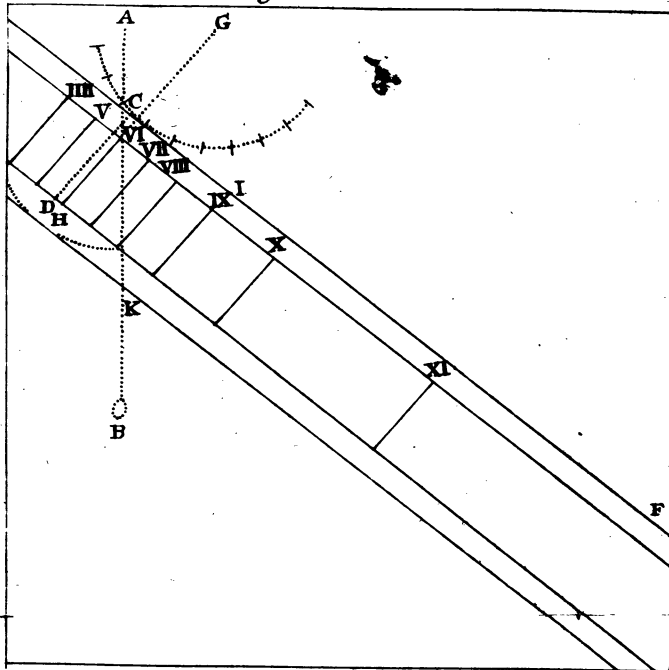
Now, if the centre of this *Dial* lay within doors, you might draw lines from the centre through these pricks in the *equator*, and those lines should be the hour lines, as in other *Dials*; but the centre of this *Dial* lies without doors in the air, and therefore not convenient for this purpose; so that for drawing the hour lines, you must consider what angle every hour line in an *horizontal Dial* makes with the *meridian*; that is at what distance in degrees and minutes the hour lines of an *horizontal Dial* cut the *meridian*, which you may examine as by operation 2. for an angle equal to the complement of the same angle, must each respective hour line with the *equator* on the cieling have.

Thus upon the point mark'd for each hour distance in the *equinoctial line* on the cieling, describe the arches I, II, III, IV, as in the figure, and finding the distance from the *meridian* of the hour lines of an *horizontal Dial* to be according to operat. 2. thus,

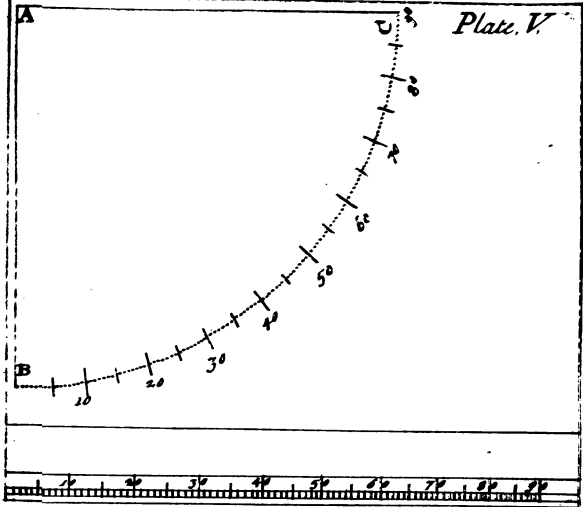
$$\begin{array}{l} \text{the } \left. \begin{array}{l} 1 \\ 2 \\ 3 \\ 4 \end{array} \right\} \text{ hour line } \left\{ \begin{array}{l} 11,40 \\ 24,15 \\ 38,14 \\ 53,36 \end{array} \right\} \begin{array}{l} \text{whose comple-} \\ \text{ment to } 90 \text{ is} \end{array} \left\{ \begin{array}{l} 78,20 \\ 65,45 \\ 51,56 \\ 36,24 \end{array} \right\}$$

I measure in a *quadrant* the same radius with those arches already drawn from the *equinoctial line*. For

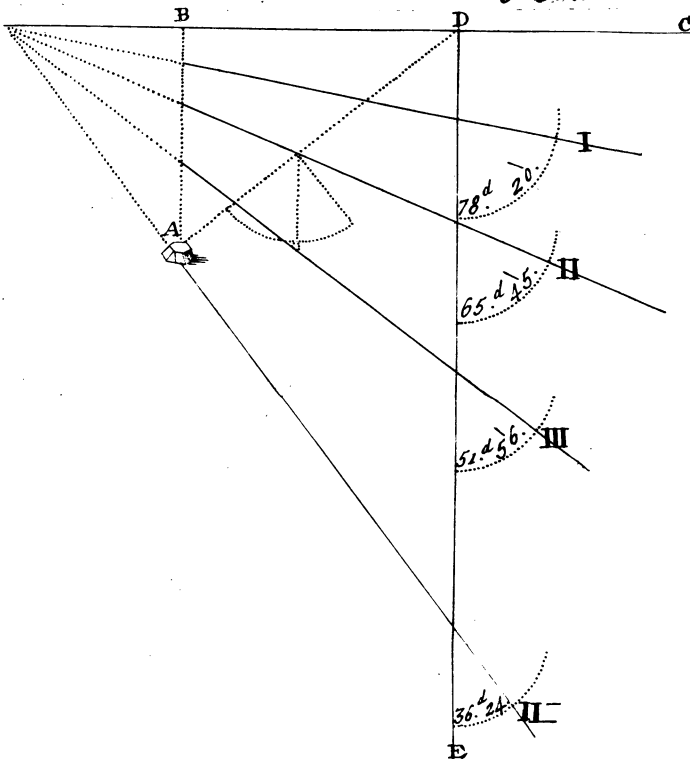
*A Direct East Dial*



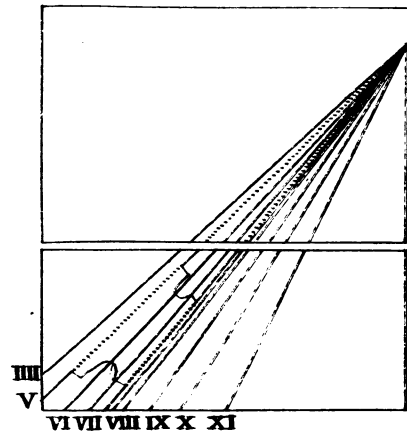
*A Plane scale or Quadrant for Dialling*



*Dial on the Ceiling of a Room, where the direct Rays of the Sun never come.*



*A Dial declining for Eastward or Westward*





# D I A

For the  $\left. \begin{matrix} 1 \\ 2 \\ 3 \\ 4 \end{matrix} \right\}$  a clock hour  $\left. \begin{matrix} 78, 20 \\ 65, 45 \\ 51, 56 \\ 36, 24 \end{matrix} \right\}$

And transfer these distances to the arches drawn on the cieling; for then strait lines drawn through the mark in the arch, and through the mark in the *equator*, and prolonged both ways to a convenient length, shall be the several hour lines (aforesaid) and when the sun shines upon the glass at *nodus*, its beams will reflect upon the hour of the day.

*Some helps to a young DIALIST, for his more orderly and quick making of DIALS. See plate 2. fig. 3.*

It may prove something difficult to those that are unpractised in *mathematical* projections, to divide a circle into 360 degrees (or which is all one) a semi-circle into 180, or a *quadrant* into 90 degrees.

The speediest way of doing which, is by a line of chords, which if you will be curious in your practice, you may make yourself; or if you account it not worth your while, you may buy it already made on box or brass of most *mathematical* instrument makers.

This instrument they call a plain scale, which does not only accommodate you with the divisions of a *quadrant*; but also serves for a ruler to draw strait lines with.

The manner of making it as follows:

Describe upon a smooth, flat, even grain'd board a quarter of an whole circle, as B C, whose radius A B or A C, may be four inches, if you intend to make large *Dials* or two inches, if small; but if you will you may have several lines of chords on your *scale* or *rule*.

Divide this *quadrant* into ninety equal parts, as you are taught in the making the *horizontal Dial*.

Then draw close by the edge of your strait ruler a line parallel to the edge, and at about  $\frac{20}{100}$  part of an inch a second line parallel to that, and at about  $\frac{1}{8}$  of an inch a third line, parallel to both.

Then place one foot of your compasses at the beginning of the first degree on the *quadrant* describ'd, on the board, as at B, and open the other foot to the end of the first degree, and transfer that distance upon your rule from B to the first mark or division, between the two first drawn lines.

Then place one foot of your compasses again at the beginning of the first degree on the *quadrant* describ'd on the board, as at B, and open the other foot to the end of the second degree, and transfer that distance upon your rule, from B to the second

mark or division between the two first drawn lines; and thus measure the distance of every degree from the first degree describ'd on the *quadrant*, and transfer it to the rule.

But for distinction sake, you may draw every tenth division from the first line parallel to the edge of the third line, and mark them in succession from the beginning with 10, 20, 30, to 90; and the fifth divisions you may draw half way, between the second and third parallel lines; the single divisions only between the two first parallel lines. So is your line of chords made.

*The use of the line of CHORDS.*

As its use is very easy, so is its convenience very great, for placing one foot of the compasses at the first division on the scale, and opening the other to the 60th degree, you may with the points of your compasses (so extended) describe a circle, and the several divisions on the scale shall be the degrees of the four *quadrants* of that circle, as you may try by working backwards, to what you were just now taught in the making the *scale*; for as before you measured the distance of the degrees of the *quadrant*, and transferr'd them to the *scale*; so now you only measure the divisions on the *scale*, and transfer them to the *quadrant*, semi-circle, or whole circle describ'd on your paper. For example.

If you would measure 30 degrees in your describ'd circle, place on the foot of your compasses at the beginning of the divisions on the scale, as at A, and extend the other foot to the division mark'd 30, and that distance transferr'd to the circle, shall be the distance of 30 degrees in that circle.

Do the like for any other number of degrees.

You may draw your *Dial* first on a large sheet of paper, if your *Dial* plane be so large, but if it is not so large, draw it on a smaller piece of paper; then rub the backside of your paper *Dial* with small-coal, till it be well black'd; and laying your paper *Dial* on the *Dial* plane, so that the lines of your paper agree with the *east*, *west*, *north* and *south* situation of your *Dial* plane.

Then with wax or pitch fasten the corners of the paper on the plane, and laying a strait ruler on the hour lines of your *Dial*, draw with the blunted point of a needle, by the side of the ruler, and the small coal rubb'd on the backside the paper will leave a mark of the lines on the plane.

If you would have the lines drawn red, you may rub the backside of your paper with vermilion; if *blue* with *verditer*, if yellow with *orpiment*, &c.

Then draw upon these mark'd lines with oil colours as you please.

If your *Dial* decline far towards the east or west, the hour lines (unless projected to a very great length) will run very close to one another; therefore in this case you must project your  
*Dial*

## D I A

*Dial* on a large table, or sometimes on the floor of a room, and cut it off as far as you think good from the centre; for the further from the centre, the larger the distance of the hour lines. See plate 2. fig. 4.

Of PAINTING *sun* DIALS, and first of the planes on which DIALS are to be drawn.

*Dial* planes are of two sorts; first, such as are made on the wall of a building; or secondly, such as are drawn on tables of wood, vulgarly call'd *Dial* boards.

The first sort, if they are made on brick-work, is done by plastering on the wall with lime, sand and hair, mix'd; this, if well drench'd with linseed oil, after 'tis dry, or as long as it will drink in any; and then with oil and white-lead, may be durable enough.

But a better way is to temper the lime, sand and hair with ox-blood, which will be no great charge, but of great advantage; for this mixture will equal in time the hardness of a free-stone, and keep the surface as free from the injuries of weather; but you must afterwards paint it white.

If you were to work on a stone, the best way is to drench the stone with linseed oil and white very thin, till it will drink in no more; then shall the *Dial* you paint upon it, last longer and be the better prepar'd against the ruins of time.

Now for tables or *Dial* boards of wood, they being the most common, I shall give such directions for making them, as have been always found most profitable and fit for the purpose.

The best woods for this purpose, are the clearest oak and the reddest fir, provided it be not turpentine; there is not much difference between these two woods, as to their alteration by the weather; they being both subject to split in case they are bound, and have not free liberty to shrink with dry weather, and swell with wet; though as to their lasting oak seems preferable, but good red fir will last the age of an ordinary man if well secured, as things of this nature ought to be.

In working either of these kinds of woods, the boards ought first to be cut to such a length as you intend your *Dial* board shall be, and so many of them as may make up the breadth design'd, and let them be jointed on the edges, and placed on both sides, and afterwards set to dry.

For it has been observ'd, that though boards have lain in a house ever so long, and are ever so dry, yet when they are thus shot and planed, they will shrink afterwards beyond belief, if kept dry.

When you think they are dry enough and will shrink no more, let them be shot again with good joints, and let every joint be secured with good dove-tails, let in cross the joint in the backside. Let this be done when the boards are glued together and well dry'd.



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After it has been thus glued, and the joints are sufficiently dry, then let the face of the board be well planed and try'd every way, that it may be both smooth and true, and the edges shot true, and all of a thickness, as pannels of wainscot are commonly wrought.

The edges must be thus true and even, that they may fit into the rabbet of a moulding, put round it, just as a pannel of wainscot does in its frame.

This will give liberty to the board to shrink and swell without tearing, whereas mouldings that are nailed round the edge as the common way is, does so restrain the motion of the wood, that it cannot shrink without tearing. But boards made this way will last a long time, without either parting in the joints or splitting in the wood.

*Dials* are sometimes drawn on planes lin'd with copper or lead, that they may be free from splitting or tearing; but a board (made as before directed) is to be preferr'd in many respects. As first, in that it is much cheaper. Secondly, Both *lead* and *copper* too will swell a little with the heat of the sun, and in time will grow hollow outwards, or convex instead of a perfect flat, which will much pervert the truth of its shadow. And thirdly, The colours will be apt to peel from the metal, and the *Dial* will by that means be in danger to be sooner defac'd, than if it were painted upon a wooden plane.

*How to make the best GLUE for gluing the joints of DIAL BOARDS.* Take a quart of water, and set it on the fire, put into it about half a pound of good glue, and boil them gently together over a gentle fire, till the glue be wholly dissolv'd, and of a due consistence, that it may not be too thin; for if it be the wood will so drink it up that it will not be of a sufficient body to bind the parts together; on the contrary, if it be too thick, it will not give way for the joint to shut close enough to be strongly join'd; for though 'tis glue that makes the joints stick, yet where there is so much of it, that the joint cannot close exactly, 'twill never hold firmly.

Whenever you come to use glue, take care that it be first thoroughly hot, for glue that is not hot, never takes firm hold on the wood.

You must also take great care that the boards you are to glue have not been touch'd with oil or grease, for in such places the glue will never take hold.

Although after a thing is once glued fast, no grease nor oil can hurt it.

The glue being ready, and the joints of the boards shot true, set both the faces of the joint close together, and both also turn'd upwards; then dip a brush in the glue and besmear the faces of both

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both joints, as quick as possible, then clap the two faces of the joint together, and slide or rub them long ways one upon another two or three times to settle them close, and so let them stand till they are firm and dry.

*Colours requisite for PAINTING a SUN-DIAL.* Four colours are sufficient for this work, *viz.* *Spanish brown* for the first or priming colour.

2. *White-lead* for the second colour, and finishing the face of the table.

3. *Vermilion* for drawing the hour lines.

4. *Lamp-black* for the figures in the margin, respecting the lines of every hour, if it be a *plane Dial*.

But if you would have your figures gilded, then some other materials are required, as *gold* and the size to lay it on, and smalt for a blue ground, if you intend a rich colour; but some lay the ground where the figures are gilt with *vermilion*, and that looks well, if the figures are lifted with black, and a black moulding round the *Dial*.

*The practice of PAINTING sun DIALS.* When according to the rules before given, you have drawn on paper the draught of your *Dial*, and that your board be ready, and colours prepar'd, you must next proceed as follows.

Take *Spanish brown* that has been well ground and mix'd somewhat thin, and with a large bristle brush dipt in it, colour the board or plane all over, both on the back as well as fore-side, to preserve it the better, so that you leave no part uncoloured; this is call'd the priming of the *Dial*.

When this first colour is dry, do it over again with more of the same colour, tempered somewhat thicker, and when this is also dry, you may, if you please, do it over again with the same colour, your work will be the substantialler and last longer.

When this last time of colouring with your priming is dry, then colour the face of the plane over with white-lead, and when it is dry, do it over again three or four times more, successively after each drying; and so will the face of your plane be sufficiently defended against the fury and violence of the weather for many years.

When the last colouring of your white is dry, you must draw on your plane (with a *black-lead* pencil a horizontal line, as far distant from the uppermost edge of your *Dial*, as you shall think fit; then set out the margin of your *Dial* with boundary lines for the hour, half hour and quarter divisions of your *Dial* (as you see is done in most *Dials*).

When this has been done, place the horizontal line of your paper draught on that which you before drew on the plane, placing the centre according as the situation of the plane for convenience sake requires.

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If your *Dial* be a full or direct *south Dial*, then let the centre be exactly in the middle of your plane; but if your *Dial* decline from the *south* either *east* or *west*, then place not the centre of the draught in the centre of the plane, but nearer to one side or other of it, according as it declines, having also respect to the quantity of its declination.

For example, if your *Dial* decline eastward, then let the centre of your draught be plac'd between the centre. and the eastern side of your plane; the quantity of which must be according to the declination of the *Dial*.

And if it declines much, place the centre of your draught the more out of the centre of your plane.

This must be done in order to gain a greater distance for those hour lines, which in declining planes fall nearer together on one side, than they are in another.

And for far decliners, as those of 70 or 80 degrees, they are frequently drawn without centres.

Having plac'd the paper draught on the plane, fasten it on with pins or tacks, then let the draught thereof be transferr'd to the plane by laying a ruler over every hour, half hour and quarter division; and where your ruler shall cut or intersect the boundary lines of your margin; there make marks by drawing lines with a black-lead pencil of such a length as each division requires; observing to draw the hour and half hour lines quite through your margin, that they may be guides for the right placing of the figures; and for a small spot that is usually plac'd in the margin, right against the half hour.

Having thus transferr'd your draught on the plane, you must draw the subtiler line, according as it lies in the draught, to be a guide for the right placing the stile or cock.

The draught being thus transferr'd on the plane, draw the boundary lines of the *Dial*, as also the hour, half hour and quarter divisions with *vermilion* well ground in oil, make the colour as thick and stiff, as you can possibly work it, so as to draw a clear even line; because this is to be done but once.

After you have drawn these lines with *vermilion*, make the figures with *lamp-black*, and a spot in the middle of the margin, right against the half hour line; and if you please you may in the margin at the top of your plane, put the date of the year, your name or some sentence.

Then fit in your cock or stile, so as to make right angles with your plane, and then will your *Dial* be finish'd.

To gild with gold on an oily size either letters or figures in *DIALS*, Whatsoever you would gild must be first drawn with a gold size. (See the articles *GOLD SIZE*, and *GILDING*.) This you must let lie on, till it is sufficiently dry to gild upon.

This

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This is to be known by touching it with your finger, for if your finger stick a little to it, and the gold size do not come off, then it is dry enough; but if the colour come off on your finger, it is not dry enough, and then it must be let alone a little longer; for if you should then lay on your gold, it would so drown it, that it would give no gloss, and if the gold size be too dry, the leaf gold will not stick.

As for the manner of laying on the leaf gold. See the article **GILDING**.

After your gold is laid on, you may if you please, diaper or flourish upon it with thin burnt umber, so thin that gold may appear through it.

*The way of painting a blue with SMALT.* Smalt being a colour that gives its greatest lustre by strewing, is to be perform'd as follows.

First, Temper up *white-lead* pretty stiff with good clear drying oil, let it be as stiff as it well can be to spend well from the pencil, with this white colour; cover over the superficies of the work, that is to be strew'd with *smalt*, and if it be the margin of a *Dial* whose figures are already gilt with gold, let every part between the figures, and where there is no gold laid on be done over, and be very exact in the work, for the *Smalt* takes no where but on this new and moist ground; then strew the *Smalt* thick on the part to be covered, and with the feather edge of a goose quill stroke it over, that it may lie even and alike thick on all places; and then with a bunch of linen cloth that is soft and pliable dab it down, that it may take well upon the ground; then stroke off the loose colour with a feather, and blow off the remainder with a pair of bellows, and your work is finish'd.

**DIAMOND**, a precious stone; the first in rank, value, hardness and lustre of all gems.

The goodness of *Diamonds* consists in their water or colour, lustre and weight; the most perfect colour is the white.

The defects of *Diamonds* are veins, flaws, specks of red or black sand, and a bluish or yellowish cast.

The *European* lapidaries examine the goodness of rough *Diamonds*, their water, points, &c. by day light.

The *Indians* do it by night; in order to which, a hole is made in a wall a foot square, and a lamp plac'd in it with a thick wick, by the light of which they judge of the stone, holding it in their fingers.

The water call'd *cælestis* is the worst of all, and yet is somewhat difficult to discover in a rough *Diamond*.

The only infallible way is to examine it in the shade of some tufted tree.

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Dr. *Wall* seems to have discovered an infallible method to distinguish *Diamonds* from other stones, which he gives as follows.

A Diamond with an easy, light friction in the dark, with any soft animal substance, as the finger, woollen, silk, &c. appears luminous in its whole body.

Nay, if you keep rubbing for some time, and then expose it to the eye, it will remain so for some time.

If when the sun is eighteen degrees below the horizon, you hold up a piece of bays or flannel, stretcht tight between both hands, at some distance from the eye; and another rubbing the other side of the bays or flannel, pretty briskly with a *Diamond*, the light is much more vivid and pleasant than any other way.

But that which he judges the most surprizing is, that a *Diamond* being expos'd to the open air in view of the sky, gives almost the same light of it self without rubbing, as if rubb'd in a dark room; but if in the open air, you put the hand or any thing a little over it, to prevent its immediate communication with the sky, it gives no light; which is a distinguishing criterion of a *Diamond*.

A *rough* DIAMOND is one that is not yet cut, but just as it comes out of the mine.

A *facet* DIAMOND is one that is cut in faces both at the top and on the bottom, and whose table or principal face at the top is flat.

A *rose* DIAMOND is one that is quite flat underneath, but its upper part cut in divers little faces, usually triangles, the uppermost of which terminate in a point.

A *table* DIAMOND is one which has a large square face at top, encompassed with four lesser.

Diamonds are only found in the *East-Indies*, and that only in the Kingdom of *Golconda*, *Visapour*, *Bengale*, and in the island *Borneo*.

There are four mines, or rather two mines and two rivers, from whence Diamonds are brought from. The mines are,

1. That of *Raolconda*, in the province of *Carnatica*, five days journey from *Golconda*, and eight from *Visapour*. This has been discover'd about two hundred years and upwards.

2. That of *Gani* or *Couleur*, seven days journey from *Golconda* eastwardly. It was discover'd between a hundred and twenty and a hundred and thirty years since by a peasant, who digging in the ground, found a natural fragment of twenty-five caracts.

3. That of *Soumelpour*, a large town in the kingdom of *Bengale*, near the *Diamond* mine: this is the most antient of them all.

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all. It should rather be call'd that of *Goual*, which is the name of the river, in the sand of which the stones are found.

4. The last mine, or rather the second river, is that of *Suc-cudan* in the island of *Borneo*.

### *The DIAMOND mine of Raolconda.*

In the neighbourhood of this mine, the earth is sandy, and full of rocks and copse.

In these rocks are found several little veins of half and sometimes a whole inch broad, out of which the miners, with a kind of hooked irons, draw the sand or earth, in which the Diamonds are, breaking the rocks, when the vein terminates, that the track may be found again and continued.

When a sufficient quantity of earth or sand is drawn forth, they wash it two or three times to separate the stones from it.

The miners work quite naked, except a thin linen cloth before them; and besides this precaution, have also inspectors to prevent their concealing of stones; which however, notwithstanding all this care, they frequently find means to do, by watching opportunities when they are not observ'd, and swallowing them down.

### *The DIAMOND Mine of Gani or Couleur.*

In this mine are found a great number of stones, from ten to forty caracts, and even more; and it was here that famous Diamond of *Aureng-Zeb*, the Great Mogul, was found, which before it was cut, weigh'd 780 caracts.

The stones of this mine are not very clear, and their water is usually ting'd with the quality of the soil, it being *black*, where that is marshy; *red*, where it partakes of *red*; and sometimes *green* and *yellow*, if the ground happen to be of those colours.

Another defect of some consequence is a kind of *Fat* appearing upon the *Diamond*, when cut, which takes off part of its lustre.

There are commonly not less than 60000 persons, men women and children at work in this mine.

When the miners have found a place, where they intend to dig, they level another somewhat bigger not far from it, and inclose it with walls about two foot high, only leaving apertures from space to space, to give passage to the water.

After the performing a few superstitious ceremonies, and a kind of feast, which the master of the mine entertains the workmen with, to encourage them; they betake themselves to their business, the men digging the earth in the place first discovered, and the women and children carrying it off into the wall round.

They dig twelve or fourteen foot deep, and till such time as they find water. Then

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Then they cease digging, and the water thus found serves to wash the earth two or three times, after which it is let out at the openings left for that purpose.

This earth being well wash'd and well dry'd, they sift it in a kind of open sieve, or riddle; then they thresh it and sift it again, searching it well with their hands to find the Diamonds. They work naked, as in the mine of *Raolconda*, and are watch'd in like manner by inspectors.

*The DIAMOND mine of Soumelpour, or river of Goual.*

*Soumelpour* is a large town, built all of earth, and covered with branches of cacao trees; the river of *Goual* running by the foot of it, in its passing from the high mountain towards the south to the *Ganges*, where it loses its name.

It is from this river are brought all our fine *Diamond* points or sparks call'd natural sparks.

They never begin to seek for *Diamonds* in this river, till after the great rains are over, that is after the month of *December*; and they usually even wait till the water is grown clear, which is not before *January*.

When the season is come, eight or ten thousand persons of all ages and sexes, come out of *Soumelpour*, and the neighbouring villages.

The most experienced among them search and examine the sand of the river, going up it from *Soumelpour* to the very mountains whence it springs.

A great sign that there are *Diamonds* in it, is the finding those stones, which we *Europeans* call *thunder stones*.

When all the sand of the river, which at that time is very low, has been well examin'd, they proceed to take up that wherein they judge *Diamonds* likely to be found, which is done after the following manner: they dam the place round with stones, earth and fascines, and lading out the water, dig about two foot deep; the sand thus got, is carried into a place wall'd round on the bank of the river.

The rest is perform'd after the manner as at *Couleur*, and the workmen watch'd with equal strictness.

*The DIAMOND mine in the island of Borneo, or river of Succudan.*

We are but little acquainted with this mine; the Queen who reigns in that part of the island, not allowing strangers to have any commerce in these stones; though there are very fine ones to be bought at *Batavia*, which are brought thither by stealth.

They were antiently imagin'd to be softer than those of the other mines; but experience shews, that they are in no respect inferior to them.

Besides



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Besides these four *Diamond* mines, there have been two other discovered, one of them between *Couleur* and *Raolconda*, and the other in the province of *Carnatica*; but they were both clos'd up, almost as soon as discover'd: that of *Carnatica*, by reason that the water of the *Diamonds* was either *black* or *yellow*; and the other on account of their cracking and flying in pieces, when cut and ground.

The *Diamond*, as has been observ'd, is the hardest of all precious stones; it can only be cut and ground by it self, and its own substance.

To bring it to that perfection, which augments its price so considerably, they begin by rubbing several against each other, while rough; after having well glued them to the ends of two sticks or blocks, thick enough to be held in the hand. It is this powder thus rubb'd off the stones, and receiv'd in a little box for that purpose, that serves to grind and polish the stones.

*Diamonds* are cut and polish'd by means of a mill, which turns a wheel of soft iron, sprinkled over with *Diamond* dust, mixt with oil of olives.

The same dust well ground and diluted with water and vinegar is us'd in the sawing of *Diamonds*; which is perform'd with an iron or brass wire as fine as a hair.

Sometimes instead of sawing the *Diamonds*, they cleave them, especially if there be any large shivers in them; but the *Europeans* are not daring enough to run the risque of cleaving, for fear of breaking them.

A *rough Diamond* ought to be chosen uniform, of a good shape, transparent, not quite white, and free from flaws and shivers.

Black, rugged, dirty, flawy, veiny stones, and all such as are not fit for cutting, are pounded in a steel mortar made for that purpose; and when they are reduc'd to a powder, they serve for sawing, cutting, and polishing the rest.

Shivers are caus'd in *Diamonds* by this, that the miners, to get them more easily out of the vein, which winds between two rocks, break the rocks with huge iron levers, which shakes and fills the stone with shivers.

The antients had two mistaken notions as to the *Diamond*; the first is, that it becomes soft, by steeping it in hot goats blood; and the second is, that it is malleable, and bears the hammer. Experience has shewn the contrary, there being nothing capable of mollifying the hardness of this stone; tho' its hardness be not such that it will endure, being struck at pleasure with the hammer.

The finest *Diamonds* now in the world are that of the Great *Mogul*, weighing 279 caracts; that of the Great Duke of *Tuscany*,

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*cany*, weighing 139 caracts; and that known in *France* by the name of *grand fancy*, which is one of the crown jewels, weighing 106 caracts; whence comes its name *fancy*, which is a corruption of *cent six*, i. e. 106.

*Tavernier*, by a rule which he had made for estimating the value of Diamonds, computes that the Great Mogul's is worth ~~110000~~ 73238 *French* livres, equivalent to 879244 pounds sterling; and that of the Duke of *Tuscany*, 2618335 livres, or 195374 pounds sterling.

The following is a rate, or manner of estimating the value of *Diamonds*, drawn up by a person exceedingly well vers'd in those matters; and which for its curiosity, as well as the use it may be of, to persons who deal in precious stones, we judge will be highly acceptable.

## DIAMONDS *cut facet, or table-wise.* *Dutch cut.*

	<i>l.</i>	<i>s.</i>		<i>l.</i>	<i>s.</i>	<i>Sterl.</i>
A Diamond weighing } 1 grain is worth.	1	00	to	1	1	
1 $\frac{1}{2}$ - - - - -	1	16	to	1	17	
2 - - - - -	2	15	to	3	00	
2 $\frac{1}{2}$ - - - - -	3	12	to	3	15	
3 - - - - -	4	15	to	5	00	
4 - - - - -	7	17	to	8	00	
5 - - - - -	15	00	to	15	15	
6 - - - - -	22	00	to	25	00	
7 - - - - -	30	00	to	34	00	
8 - - - - -	42	00	to	45	00	
9 - - - - -	60	00				
10 - - - - -	75	00				
12 - - - - -	112	00	to	120	00	
15 - - - - -	187	00	to	220	00	
19 - - - - -	330	00	to	380	00	
24 - - - - -	450	00				
30 - - - - -	700	00	to	735	00	
40 - - - - -	1500	00	to	1800	00	
50 - - - - -	3500	00	to	4500	00	
60 - - - - -	4500	00	to	5620	00	

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*Antwerp cut.*

		<i>l.</i>	<i>s.</i>		<i>l.</i>	<i>s.</i>
A Diamond weighing } 1 grain is worth from }		00	15	to	00	18
1 ½	- - - - -	1	6	to	1	10
2	- - - - -	2	2	to	2	5
3	- - - - -	3	12	to	3	15
4	- - - - -	6	00	to	6	7
5	- - - - -	10	10	to	11	5
6	- - - - -	13	10	to	15	00
7	- - - - -	18	15	to	22	10
8	- - - - -	24	00	to	26	00
9	- - - - -	33	15			
10	- - - - -	37	00	to	40	00
12	- - - - -	55	00	to	58	00
15	- - - - -	112	00	to	130	00
18	- - - - -	247	00			
24	- - - - -	315	00			
40	- - - - -	900	00	to	970	00
50	- - - - -	2200	00	to	2300	00
60	- - - - -	3500	00	to	4500	00

It must be observ'd however, that defects in the water or shape, red or black spots, shivers, and other failings frequently found in these stones, reduce the price by one third, and sometimes more.

As to *brilliant* or *rose* DIAMONDS, the price is always less by one third than table Diamonds, tho' the weight be the same; the reason is, that the latter shew themselves a great deal more when set in their collets, than the former.

The *factitious* DIAMONDS made in *France*, call'd *temple Diamonds*, because the best of them are made in the *temple* at *Paris*, are vastly short of the genuine ones; and accordingly are but little valued, tho' the consumption thereof is pretty considerable for the habits of the actors on the stage.

DIAMONDS, *the way of making artificial ones.*

To counterfeit DIAMONDS, so as to endure the fire and harden them. Take of good natural crystal, calcin'd and reduc'd to subtile powder, what quantity you please; fill a pot with it, and set it in a glass house furnace for twelve hours to be melted and purified; then drop the melted matter into cold water, then dry it, and reduce it again to powder; add to that powder its weight of fine salt of tartar.

Mix these two powders well, and make little pills of them with common water.

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Then wipe these pills, and put them into an earthen pot on a strong fire there to grow red hot for twelve hours without melting.

Then put them into a pot in a glass-house furnace, where let them stand two days to be well melted and purified; then set the matter for twelve hours in the annealing furnace to cool gradually.

Afterwards break the crucible, and you will have a fine material for *Diamonds*, which must be cut and polish'd at the wheel.

*Another way of making the DIAMOND of Alenfon.* This way of making *Diamonds* is not quite so fine as the precedent, but has notwithstanding several advantages which attend it; besides it is more easy, since there only needs an ordinary fire to succeed in it.

Take an earthen glaz'd pot, set it on a little furnace; put in some filings of steel with some vine-ashes at discretion, wherein place by one another crystals cut and polish'd; then pour common water gently on it, which warm and boil during the space of twelve hours, taking care to add boiling water fresh into the vessel, as it consumes by boiling, and take care to keep it continually boiling.

Then examine if the *Crystals* have acquired the colour and hardness you expected; if they have not, continue the fire some hours longer, and they will be like the true *Diamonds of Alenfon*; but then they must be repolished again at the wheel to give them colour and brightness.

*To give the true colour and hardness of a DIAMOND to CRYSTALS and DIAMONDS of Alenfon.* There are crystals and precious stones which have no natural hardness; which however may be given them by art, they having all the natural dispositions thereunto required, since they have the same principle as the most fine, and that they only want a little sulphur, which hindered their thorough coction.

Thus this defect may be obviated in precious stones, as well as metals, by giving them a due coction, and so changing them for the better.

The colour and hardness of *Diamonds* may be given to the crystals and *Diamonds of Alenfon*, by making a paste of good *Dutch Tripoli*, with water out of a smith's forge; in which you must wrap up the crystals or *Diamonds of Alenfon*, being first cut and polished; then put it into a crucible cover'd and luted, and set it on a gradual fire, where let it stand till the crucible becomes red hot.

A little while after, take out the stones, and polish them again at the wheel to give them their colour.

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To set them in works, take *Indian* paper, with leaves of tin, like those that are put behind looking glasses; then let them be set by some good goldsmith, and they can scarce be distinguish'd from fine ones, except by very nice discerners.

*Another way to harden* CRYSTALS and DIAMONDS  
of Alenfon.

CRYSTALS also acquire hardness in the paste, we are now going to describe, because their humidity exhales, and they become more fixt.

Take barley-meal well sifted, with *petroleum* or rock oil; then cut that paste in the middle and put all the stones in order, so that they may not touch one another.

Then cover the stones with the other half of the paste, put it into a crucible, covered with another, and luted well together and let it dry.

This being done set the crucible in a gradual wheel fire from five to six hours, a small fire the two first hours, which increase from two to two hours, till the end of the six; then let the whole cool of itself.

When it is cold, break the crucibles, and you will find the stones very fine, shining and sparkling like fine *Diamonds*, which polish again at the wheel, and let them be set by a skilful workman.

*A method of hardening* CRYSTALS and DIAMONDS of Alenfon, and to make them sparkle as much as natural oriental DIAMONDS. Take one pound of a load-stone, a pound of quick-lime, and half a pound of common sulphur; the whole reduc'd to powder, and well mix'd.

With this powder cement your *crystals* and *Diamonds* of Alenfon well cut, in a crucible, covered and luted well when the lute is dry, set the crucible in a glass-house furnace for three days; in a place where the matters may be continually red hot with fusion. If you have not a furnace ready at hand for that purpose, take care not to take out the crucible all at once, but let it cool gently; otherwise there will be danger of the stones breaking.

Break the crucible, and you will find your stones very fine and shining, and which will resemble *Diamonds* of the old rock.

Polish them again at the wheel, to give them a colour, and work them, and they can scarce be distinguish'd from true ones.

*The way of turning white* SAPPHIRE into true DIAMOND.

The white *sapphire* being fine and fix'd, is only imperfect by reason of its wanting colour and hardness, which may be remedied by art, and be made to surpass nature; because she only  
would

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would have made it a perfect *sapphire*, but art can turn it into a true *Diamond*.

It is only fire can work this effect, in changing its natural colour, and giving it that of a *Diamond*.

Thus take very fine sand, wash it in several waters to cleanse it, till the water become clear and then dry it.

Fill a crucible half full with this sand, then put in your *sapphire*, and fill it up with the same sand.

Then cover your crucible with a cover of the same earth or with another crucible, lute the whole with a good lute, and lay it on an inch thick, and let it lie in the shade being dry, set it in a glass-house furnace, approaching it nearer to the fire by degrees, and leaving it twelve hours in the same degree of heat.

Then withdraw it by little and little for the space of six hours, and let it cool gently. The crucible being cold, break it, and you will find therein your *sapphire*, which will have all the qualities of a fine *Diamond*; that is its shining and hardness. Polish it again at the wheel, and work it.

### *Another way of turning white SAPPHIRE into a true DIAMOND.*

This will be easier to those, who have not the conveniency of a glass-house furnace, for it may be done with a wind furnace in twelve hours time.

You must wrap up your white *sapphire* in a thin iron plate, that it may be easily manag'd.

Then take fine gold purified by *antimony* to the highest, put it in a crucible in a wind furnace, melt it, and when it has a good fine gloss, put the *sapphire* covered with the iron plate into the bath, so that it may float on the gold on every side; then give it a strong fire for twelve hours, so that the gold may be all the while in fusion.

Take out the *sapphire* with a little pair of tongs, shaking out the gold that may chance to stick in the leaf-iron; then let it cool by the fire gently for fear it should break.

When it is cold, take away the plate of leaf-iron, and you'll have your *sapphire* of an admirable beauty, it having acquir'd by that coction all the qualities and perfections of the natural *Diamonds*. Polish it at the wheel, and work it.

*Another way to turn the white sapphire into a true DIAMOND.* Take filings of iron or steel, put them in a crucible, then put in your white *sapphire*, so that it may be wholly covered with the filings; set the crucible in the furnace, and give it a good fire, that the filings may be red hot without melting.

After it has been some time in the fire, take it out with a little pair of tongs, to examine if it be of the colour of a *Diamond*; put it into the filings again, and repeat this till it is perfect.

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You may do the same thing with filings of steel, and an equal part of white enamel in powder.

Having well mixt them together, put them in a crucible, and put your *sapphire* in the middle of them; after having first pasted them with the powder of enamel wetted with spittle, and well dry'd at the fire.

When the matter is red, and has remained some time in that condition, take out the *sapphire* with the tongs, to see if it has taken the colour of a *Diamond*, if it has not, put it in again as before, and continue to do this till it is perfect. Then polish and work it.

DIAMONDS are represented [in miniature] by laying them quite *black*, and heightening with gentle touches of *white* on the light-side.

DIANA, who was also call'd *Cynthia*, *Lucina* and *Luna*, was, according to *Propertius*, represented in painting, &c. in the likeness of a young beautiful virgin; having on each side of her forehead two glittering horns, newly putting forth; drawn through the air in a purple coloured coach, by two swift pac'd horses; the one of a *sad colour*, and the other a *white*.

*Boccace* says, that the two different horses intimate, that she hath power both in the day and night.

*Claudian* says, that her chariot was represented drawn by two white bullocks (which image the *Egyptians* worshipped with great zeal and reverence) having one of their flanks bespotted with divers stars, and on their heads two such sharp horns as the moon has in her chiefeſt wane.

*Cicero* describes the statue of *Diana* (which he brought out of a temple in *Cilicia*) of a wonderful height and large dimension, the whole body cover'd with a large thin veil, of a youthful aspect, holding in her right hand a lively burning torch, and in her left an ivory bow, with a quiver of silver headed arrows hanging at her back.

The poets who call her the goddess of hunting, and the imperial governess of woods and groves, describe her in the habit of a young nymph, with her bow ready bent, in her hand a quiver of arrows hanging by her left side; a swift pac'd greyhound fast tied to her right side with a collar about his neck, and troops of *sylvan* virgins following her, which are chaste and call'd the *nymphs* of *Diana*.

*Pausanias* tells us, that there was a statue of *Diana* in *Arcadia*, covered with the skin of a hind, and a quiver of arrows hanging from her shoulders, holding in one hand a burning lamp, the other leaning upon the heads of two serpents and before her feet a hound.



The *Egyptians* are suppos'd to have worshipped her under the name of *Isis*, and represented her in painting, covered with a black and sable vestment, in token that she herself gives no light, holding in one hand a cymbal, and in the other an earthen vessel of water, upon which, as *Servius* says, many thought her to be the genius of *Egypt*.

By the cymbal is intimated the murmurings and roarings of *Nilus*, when it overflows *Egypt*; and by the earthen vessel the nature of the country, which is moist and full of lakes, pools and rivers.

She is also painted with yellow hair, a grass-green mantle trimm'd with silver, silver buskins, golden bow and quiver of various colours.

The *nymphæ Dianæ* are depicted in white linen, to denote their virginity, and their garments girt about them, their arms and shoulders naked; bows in their hands and arrows by their sides.

DIDO Queen of *Carthage*, is depicted in a purple or scarlet mantle, and her upper garments purple, with yellow hair, ty'd up with spangles and knots of gold, holding in her hand a golden quiver.

ABRAHAM DIEPENBEC, a scholar of *Peter Paul Rubens*, excell'd in history.

Lord Bishop DIGBY, the reverend Lord Bishop of *Elfin* in *Ireland*, may very well find a name in the account of *English* painters, since he has deservedly rais'd one in that kingdom, where he arriv'd to be a spiritual peer. His limnings have much of beauty and boldness of draught in them, and are to a great degree elaborate with a due regard to a graceful part of nature; he is a single instance of any person of that robe, that has made so considerable a progress in this art, as to be voted a master either in that kingdom or this, how common soever it is in other nations for the clergy to apply themselves to painting.

DIGNITY is represented in painting, &c. by a woman richly adorn'd, but sinking under the burthen of a huge stone, enchain'd within a border of gold and precious stones; her load expresses dignity, because that proceeding from the care of publick affairs, is a very heavy burthen and hard to be supported.

ADRIAN VAN DIEST, was a famous landscape painter born at the *Hague*, but whom we may very well term an *English* painter, being brought up here from his youth; he was chiefly instructed by his father, who commonly drew sea-pieces, but that which contributed most to make the son a master, as he often owned, was drawing after those noble views of *Eng-*  
*land*

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*land* in the western parts and along our coasts. He also drew many of the ruined castles in *Devonshire* and *Cornwall*, being encouraged by that noble peer the Earl of *Bath* at his seat in those parts. This painter's distances have a peculiar tenderness, and his clouds a freedom that few have arrived at.

**DILIGENCE** is represented in painting, &c. by a woman of a lively aspect, with a sprig of thyme in one hand, and a bee buzzing about it; in the other a bundle of almond and mulberry leaves, and a cock at her feet scraping.

The bee represents *Diligence*, by sucking a pleasant juice out of a dry herb, the almond and mulberry leaves, the middle way between hastiness and slowness in business; the first flourishing very early, and the other very late; the cock by his scraping denotes that he rising betimes, can discern a barley corn from dung.

**DIOPTRICKS**, is properly the third branch of opticks; its office being to consider, and explain the effects of light refracted, by passing through different *mediums*, as *air*, *water*, *glass*, &c. and especially *lens's*.

**DIRECT** *vision* in opticks, signifies that perform'd by *direct* rays, in contradistinction to *vision* by refracted or reflected rays.

**DIRECT** *rays* are those which pass in right lines from the luminary to the eye, without being turn'd out of their rectilinear direction by any intermediate body, either opake or pellucid.

**DISCRETION** is represented in painting, &c. by an aged woman of a grave countenance, inclining her head to the left, lifting up her arm as a token of pity; with a plummet in one hand, and a camel by her side.

The plummet denotes *Discretion*, by adapting itself to human imperfections, and never deviates from itself, always just and perfect, the camel prudence, never carrying a burthen above its strength.

**DISPERSION**, as point of *Dispersion* in *dioptricks*, is a point from which refracted rays begin to diverge, when their refraction renders them divergent.

It is call'd the *point of Dispersion* in opposition to the *point of concurrence*, which is the point wherein converging rays concur after refraction.

**DISSIMULATION** is represented in painting, &c. as a lady wearing a vizard of two faces, in a long robe of a changeable colour, and in her right hand a magpie.

*A line of* **DISTANCE** [in perspective] is a right line drawn from the eye to the principal point.

*Point of* **DISTANCE** [in perspective] is a point in the horizontal line at such a distance from the principal point, as is that of the eye from the same.

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**DISTEMPER** in *painting*, is a term us'd for the working up of colours with something else besides water or oil.

If the colours are prepar'd with *water*, that kind of *painting* is call'd *limning*, and if with oil it is call'd *painting in oil*, and simply *painting*.

If the colours are mixt with size, whites of eggs or any such proper glutinous or unctuous substance, and not with oil, they then say it is done in *Distemper*, as the admirable cartoons at *Hampton-Court* are.

**DISTEMPER.** *The painting in Distemper.*

Before a *Fleming* nam'd *John Van Eyck*, but better known by the name of *John of Bruges*, found out the art of *painting in oil*, all painters work'd in nothing but *Fresco*, *Temper* and *Distemper*, as it is commonly call'd, whether it were on walls or boards, or any where else.

When they painted on boards, they often pasted on some fine cloth with good paste to hinder them from parting; they then laid on a *layer of white*, after this they tempered their *colours* with water and paste, or rather water and yolks of eggs beat together with little fig-tree branches; the milk of which mixing with the eggs, with this mixture they painted their pictures.

All *colours* are proper in this sort of work, except the white of *lime*, which is never us'd but in *fresco*.

*Azure* and *ultramarine* must be us'd with a paste made of *glove-skin* or *parchment*, for the yolks of eggs will make the *blue colours* turn *green*; which they do not with paste nor gum, neither on walls nor boards.

If the work is on walls, care must be taken that they be dry: the painters must even lay on two *layers* of paste quite hot, before he applies the colours, which if he pleases, he may also temper with *paste*; for that composition of eggs and the fig-tree branches, is only to touch the work over again the more conveniently; and that he might not be oblig'd to use fire, which is necessary to keep the paste hot.

However, it is certain, that the colours with paste keep better.

And thus have all the *designs* or *cartoons* for tapestry been painted on paper. This paste, as has been said, is made of *glove-skin* or *parchment*.

When a painter would work upon cloth, he must chuse that which is old, half us'd and very smooth; then press pounded plaister with *glove-skin paste*, and lay it over and when that composition is dry, put another *layer* of the same *paste* over it.

All the *colours* are pounded with water, each by itself, and as the painter wants them for his work, he tempers them with  
*paste*

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*paste-water*; or if he will only make use of the yolks of eggs, he takes water to which he puts one glass of vinegar to the same quantity of water, the yolk, white and shell of an egg, with some ends of fig-tree branches, cut into small pieces, and beats them well together in an earthen pan.

If he would varnish the picture when 'tis finish'd, he need only rub it with the white of an egg well beaten, and then put one layer of varnish over it; but this is seldom done, unless it is to preserve it from water, for the greatest disadvantage of *Distemper* is that it has no glittering, and all its colours look dead; by which means they appear alike in all sorts of *lights*, which *oil colours* or colours in *Distemper*, when varnish'd do not.

DIVERGENT  $\{$  *lines* [in geometry] are such whose distance  
DIVERGING  $\}$  is continually increas'g.

Lines which converge one way, *diverge* the opposite way.

DIVERGENT  $\{$  [in *opticks*] is particularly apply'd to rays,

DIVERGING  $\}$  which issuing from a radiant point, or having in their passage undergone a refraction or reflection, do continually recede further from each other.

In which sense the word stands in opposition to *convergent*, which signifies that the rays approach each other, or that they tend to a centre, where being arriv'd, they intersect, and if continued further, become diverging.

Concave glasses render the rays diverging, and convex ones converging.

Concave mirrors make the rays *converge*, and convex ones *diverge*.

DIVINITY is represented in painting, &c. by a lady all in white, with a flame on the crown of her head, and a blue globe also flaming in each hand.

The white signifies the purity of the Trinity, the object of the study of a divine is express'd by the three flames; the globes denote eternity by the round figure inseparable from the divine essence.

D. M. C. signifies *Dominico Maria Canuti*, a copious painter of *Bologna*.

DO. CAP. 1518. stands for *Dominico Campagnola* of *Venice*.

Mr. WILLIAM DOBSON born in the year 1610, imitated *Van Dyck*, liv'd at *London* and *Oxford*, excell'd in portraits, died in the year 1647, aged thirty seven years.

DOMINION is represented in painting, &c. by a man in a noble sumptuous habit, his head surrounded with a serpent, a scepter in his left hand with an eye upon it; his arm extended and pointing with his fore-finger, as is usual with those who have *Dominion*.

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The serpent was a notable sign of *Dominion* amongst the *Romans*, as is confirmed by the example of *Severus* and young *Maximinian*; both whose heads being surrounded with serpents, without offering them any harm, was a token of future grandeur; as for the eye, it signifieth the vigilance a great prince ought to have, who has an absolute command over a people.

DOMINION OVER ONES SELF is represented in painting, &c. by a woman sitting upon a lion, guiding the bridle, which he holds in his mouth with one hand, with the other pricks him.

The lion denotes the mind and its strength, that reason should curb the spirit if too brisk, and spur and prick it if too drowsy and dull; so that reason is a ray sent from heaven to govern us in all our actions.

DRAPERY in painting and sculpture, signifies the representation of the garments or clothing of human figures; it also includes, not only the garments, but also hangings, tapestry, curtains, and most other things that are not carnations or landscapes.

The art of *Drapery* consists chiefly in three points, *viz.* the order of the folds or plaits, the different quality of the stuffs, and the variety of their colours.

1. As to the folds, they ought to be so managed, that you may easily perceive what it is that they cover, and distinguish it from any thing else; as for instance, that you see 'tis an *arm* that is under the drapery, and not a *leg*; or a *leg*, and not an *arm*, &c.

Again, the folds ought to be large, as breaking and dividing the sight the less. There likewise should be a contrast between them, otherwise the drapery will be stiff.

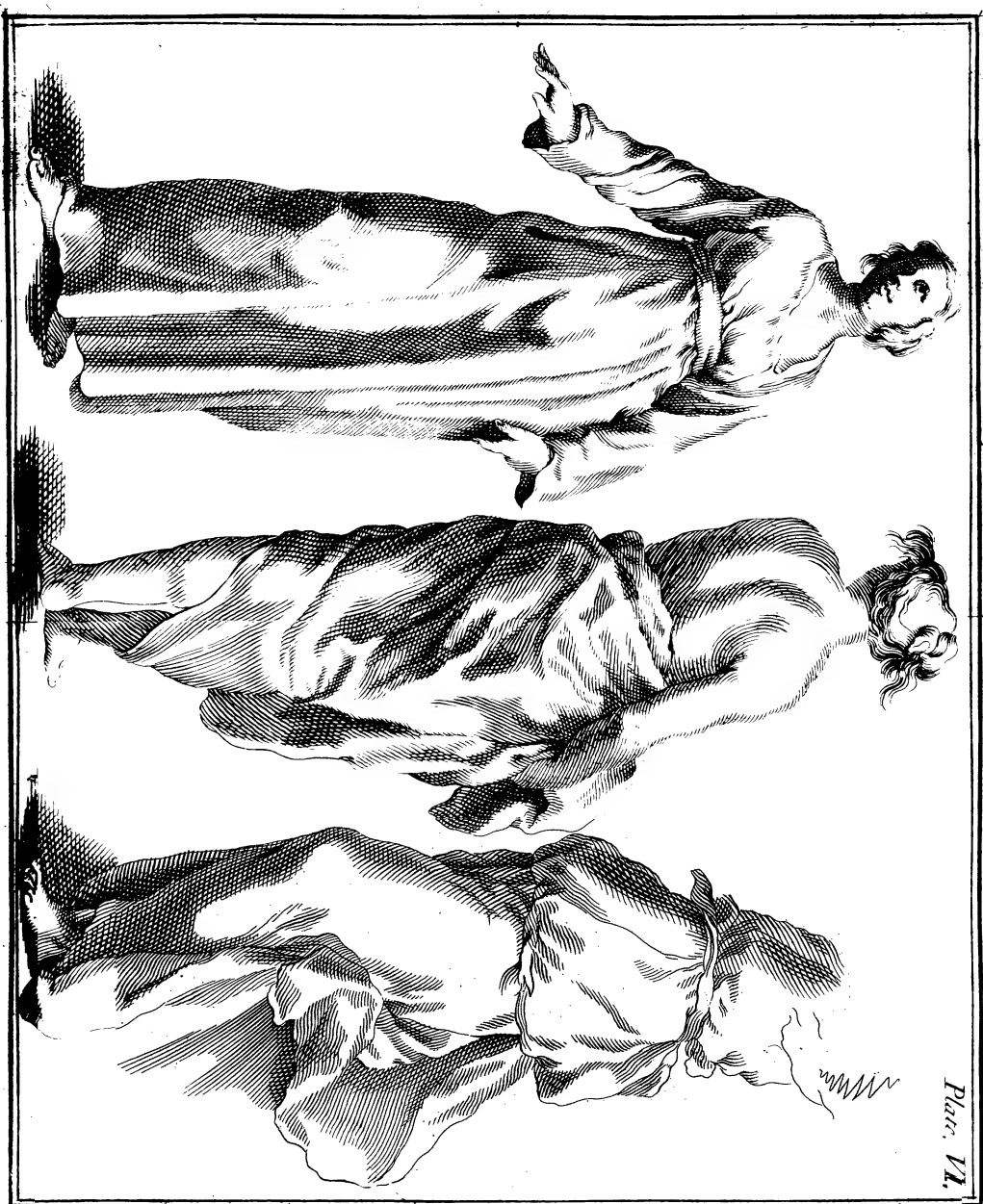
2. The *quality of the stuffs* should likewise be well considered; some causing their folds to be abrupt and harsh, and others more soft and easy.

3. Again, the surface of some have a lustre, and others are flat and dead; some are fine and transparent, others firm and solid.

4. The *variety of colours*, when well managed, makes the greatest beauty of painting; all not being equally amicable and friendly, with respect to each other; and some never to be plac'd near certain others. See COLOURING.

Mr. *de Piles* gives abundance of good observations as to *Drapery*.

He observes, that their first effect, and that which the painter ought to have principally in view is, that they express the thing they are suppos'd to cover.







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2. That they must never be made to adhere and stick to the parts of the body.

3. That a great lightness and motion of the *Drapery* are only proper in figures in great agitation or expos'd to the wind.

4. That the nudities of the figures should always be design'd before the painter proceeds to the *Draperies*.

1. Draw the out-lines of garments lightly, and be very careful in it, for the whole grace of the picture lies in it; then draw the great folds first, and stroke those into lesser, and be sure that they cross not one another.

2. Suit the garments to the body, and make them bend with the body, according as it stands in or out, strait or crooked, or turns one way or another; the closer the garment fits to the body, the narrower and smaller must the folds be.

3. All the folds must consist of two lines and no more, which you may turn with the garment at pleasure, shadowing the inner deeper, the outermost more light; and if the folds be never so curiously contriv'd, spare not to shadow them (if they fall inward from the light) with a double or triple shadow, as the occasion requires.

4. The out-lines must be continued through the whole garment, the lesser you may break off and shorten as you please.

5. The shades in silk and fine linen are very thick and small, which require little folds, and a light and rare shadow, commonly but double the most; and so also fine drapery requires more and sharper folds than coarse.

6. That part of a garment that fits close to a body must not be folded at all; but only sweetly shaded to represent the part of the body that lies under it.

7. Observe the motion of the wind and air for drawing loose apparel all one way, drawing that part of the garment first, which lies highest and closest upon the body, before you draw the looser part that flies off from the body, lest by drawing the loose part of the garment first, you should be out, and so place the body crooked or awry.

8. You ought also to examine the nature and disposition of light, especially as it has relation to the sun or any bright body; for that colours cannot be seen but in the light, and by the help thereof they appear with a grace.

9. Suppose blue be equally dispersed through all the parts of a garment, so that there is no more in one part than another; yet notwithstanding, when it is illustrated by any light, it causeth one kind of brightness in that part where it strikes strongly, and another kind of lustre where it strikes more weakly, and another in that part where it yet shines less.

10. Now to imitate this blue, you must take your artificial *blue* colour, and temper it one way to express the natural blue of the garment; but another way to express it in the light, *viz.* you must mix so much *white* with your *blue*, as you find light in that part of the garment, where the light strikes; more (or less) white, where it strikes with less; and still in proportion, less and less, till you come to the parts where the light shines not.

11. Where the light shines not but by *reflection*, there you must only mix so much shadow with the *blue*, as shall be enough to express that counterfeit light, losing it self as it were by degrees; always taking care to make the lights and shadows to answer.

12. The folds or plaits ought to run out every way like branches or arms from the body of a tree; and to be so made, that one plait may so rise from another, as one branch or bough or one stream of water comes out from another, in such sort that there be no part of the garment, wherein there appear not some of these folds.

13. Now these motions ought to be moderate, gentle and free, without any interruption, more to be admired for their grace and facility, than for affected pains and industry; and because all sorts of cloths have their several motions, as well as bodies; it must needs be, that they differ between themselves, according to the things wherein they disagree.

14. For this cause, there must be more light in fine cloth, as *sarcenet*, *linen*, *cambrick*, *cypress*, &c. in which the plaits are small, rais'd up; trembling, and as it were sweetly waving; somewhat puff'd up; by extending and spreading themselves like a snail, where the motion receiveth more strength by the wind, they fall close upon the bare skin, as is to be seen in women's garments, upon which, by reason of their thinness, they fall close upon the parts, on that side where the wind blows, but are blown up on the contrary side; the same happens in mantles, the loose ends of girdles and garters. All which motions more fitly appertain unto the apparel of nymphs, goddesses, &c. by reason of their lightness and airiness.

15. Gross and dull shadows are found in stiff cloths, where the plaits are few and gross, so that they are capable but of slow motion, and therefore they sink downwards, and can scarcely fall close to the bare skin, for that their own grossness sustains them; and these motions do mostly appear in cloth of gold, thick leather, coarse woollen cloth, &c. upon which the air can have little or no force.

16. Moreover, the plaits or folds must have their motions accordingly as they are manag'd by the wearer, as under the arm

and under the knee, by opening and stretching out the arm and leg ; always making hard, stiff and gross folds, without weakness or pliability, in such sort, that by their appearance, the nature and quality of the garment may be known.

17. But *mean motions*, which are neither too gross nor too slight, are such as appear in the folds of stuff and other cloths of fine wool ; and these may easily enough be mov'd by the air, or become pliable to a person's limbs ; and so make not only sweet and pleasant folds, but may follow the bare flesh very well, becoming moveable and nimble, and falling plially about the loins or any other part.

But besides these, there are also other kinds of mixt motions, call'd turnings or crossings, which are proper unto damasks, cloths of gold, sattins, taffaties, &c.

In which, folds crossing and breaking one another, appear from the various natures, qualities, and conditions of the drapery ; but these things are so to be perform'd, as not to favour of an over affected imitation, without grace or order, to the scandal of the artist and his designs.

**DRAPERIES.** To make blue Draperies in miniature, put ultramarine near the white on your pallet, and mix them in such proportions, as to produce a very pale colour and of a good body. With this you may express your brightest lights ; and afterwards add more ultramarine for such as are darker, and so continue to do to the deepest fold and darkest shades, which must be pure ultramarine ; and all this must be done with broad strokes of the pencil, with a due regard had to the scumpling of the different degrees of light and shade, losing the lights into the shades, with a colour not so pale as the lights, or deep as the shades. Then stipple the whole with the same colours and the same degrees, but somewhat strongly, that the points may be seen ; the whole must flow imperceptibly together, that the folds may not appear cut, and no line of separation be seen. When for the deepest shades the ultramarine happens not to be dark enough, how much soever it may be gumm'd, you mix indigo with it to give them the last degree of depth ; and if the lights are not strong enough, you may heighten them with white and a very little ultramarine.

A carmine Drapery is done after the same manner with the blue, except that in the darkest places you lay on vermilion before you use the carmine, which is apply'd without any white, and in the deepest shades it must be well gumm'd. To deepen it the more, add a little bistre.

There is another Drapery all of vermilion, with a mixture of white for the lights, laying it on single upon the darkest parts, and adding carmine for the deepest shades. You finish then  
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with the same colours, as in other draperies; and if the carmine and vermilion together are not strong enough, take carmine alone, but only for the deepest shades.

A Drapery of lake is done like that of carmine, mixing a good deal of white therewith for the lights, and but very little for the shades: you are to finish with stippling, but we use no vermilion.

Purple Draperies are made by the same rule, having first prepar'd a mixture of carmine and ultramarine, and continually using white for the lights. If you would have it a columbine or light purple, your carmine must be in greater quantity than the ultramarine; but if you would have it be more blue and deep, let there be more ultramarine.

For a flesh colour drapery, begin with laying on a very pale mixture of white, vermilion and lake; and shade with the same colours, diminishing the quantity of the white.

This Drapery must be very pale and delicate, because it must represent a slight stuff, and even the shades must not be dark.

For a yellow Drapery, lay on all over, first masticote, and then over that gambooge, excepting only the lightest parts, where you must leave the masticote pure. Then shade with oker, mingled with a little gambooge and masticote, increasing and decreasing the quantity of this last, according to the strength of the shades; and when you want them to be still darker, add gall-stone. You may work with gall-stone alone for the deeper shades, adding thereto bistre, if it be not dark enough; finish with the same colours you began with, stippling and blending the lights with the shades.

For another sort of yellow, use *Naples yellow* or *French pink*, instead of masticote or gambooge.

Green Drapery is produc'd by colouring all over, with verditer, with which, if it prove too blue for you, you may mix masticote for the lights, and gambooge for the shades. Then add a proportion of sad green to shade with; and as your shades grow very deep, you must add the darker greens, and even use them unmix'd, where you want to be extremely dark. Finish with the same colours, a little darker than at first.

For a black Drapery, you must lay on black and white, and finish with the same, encreasing the black as you want it for the shades; for the deepest of which add some indigo, especially if you would give your Drapery the look of velvet. You may in all cases touch up your lights with a brighter colour.

For a Drapery of white woollen cloth, lay on a mixture of white, a very little oker, orpiment, or gall stone, to give it a yellowish cast; then shade and finish with blue, a little black, white, and bistre mix'd together, adding this last for the brownest shades.

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A light grey is laid on with black and white, and finish'd with the same, made a little darker.

For a minim, dark, brown, tawney, or dun Drapery, lay on bistre with white, a little brown red, and shade with the same mixture, but let it be a little darker.

There are other sorts of Draperies, call'd changeable, because the lights are of one colour and the shades of another; these are us'd for the cloathing of angels, and for other young and gay figures, as also for scarves, and other light parts of dress, which fall into a number of folds and flow to the wind. These are most commonly purple, and of these there are two sorts, the one with blue lights, and the other with yellow.

For the former, lay on ultramarine and white very pale for the lights, and shade with carmine, ultramarine and white, the same as for a purple drapery, so that only the very brightest lights appear blue, and even then you must stipple with purple, with a large quantity of white, and scumble the whole artfully together.

For the latter, use masticate for your lights instead of blue; then proceed as for a drapery of pure purple, except that you must stipple and blend lights with the shades, that is the yellow with the purple, by the help of a little gambooge.

Carmine red is order'd like this last, that is, the lights must be masticate, and the shades carmine; and to scumble them, you must use gambooge.

Lake red, like carmine.

Green must be order'd in the same manner as lake, continually mixing verditer with the sadder greens for the middling shades.

Many other sorts of these may be contriv'd at pleasure, keeping to the union of the colours, not only in one figure, but also in a group of several figures, avoiding, as much as the subject will permit, to put blue next to a flame colour, or contrasting green with black, and so of others that disagree or afford no proper union.

Other Draperies may be made of sad, dirty, and brown mixtures and simples, and all by the directions already given; others also may be contriv'd, both of broken and complicated colours, but a harmony between them must be preserv'd, that they do not offend the eye. There is no laying down a rule to guide you in this; you must by practice and experience make yourself acquainted with the power and effect of your colours, and work accordingly.

Linens are painted thus: Having drawn your folds, as when you do Drapery, lay on white all over, and then proceed and finish with a mixture of ultramarine, black and white, taking  
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more or less of this last, according to the degrees you want of light and shade; and for the deepest folds, take bistre and a little white, using it sparingly and with artful touches; and you may even take the former alone for the deepest shades, where you must express the folds, and lose them into the rest.

They may be made after a different manner, by laying on, all over, a very pale mixture of ultramarine, black, and white, and then proceed in the manner above directed with the same mixture, but a little deeper. And when the shades are stippled and finish'd, you must heighten the lights with pure white, blending them with the first colour or ground; but of what sort soever you make them, you must when they are finish'd, prepare some yellowish tints for certain places, laying them on lightly, as it were a wash, so as to be transparent, and neither to hide the stippling nor the shades.

Yellow linens are made of white mix'd with a little oker; then proceed and finish with bistre, mixt with white and oker; and for the deepest shades, with bistre alone. Before you finish, lay on tints of oker and white here and there, and others of white and ultramarine, as well upon the shades as the lights, but very thin; and then stipple and scumble the whole together, and it will have a fine effect. As you finish, touch up the extremities of the lights with masticote and white. These linens, and the former, you may stripe like *Egyptian* scarves, with blue, red, ultramarine and carmine; a red one between two blue ones, very bright on the lights, and stronger in the shades.

The heads of virgins are generally dress'd with veils of these sorts, and of the same are made a sort of handkerchiefs for an open breast, because they are very becoming to the flesh.

When you would have either the one or the other of them to be transparent, and shew whatever, whether stuff or flesh, is underneath, lay them on at first very thin, and mingle with your shading colour, a little of that which is under them, particularly at the extremities of the shades, and touch only the extremities of the lights (only for the yellows) with masticote and white, and for the whites with white alone.

They are also to be made another way, especially when you would have them quite transparent, as muslin, lawn, or gauze. To this purpose, you must begin and finish what is beneath, as if nothing was to be over it; then heighten the brightest folds with white and masticote, and shade with bistre and white, or black, or blue and white, according to the colour you aim at, and taking away from the liveliness of the rest by soiling it over, though that be not altogether necessary but for the darker parts.

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For crape, do as above, only observe, that you draw the folds and the borders or edges with little threads alone, upon what is beneath, which must first be finish'd.

When you would water a stuff of any sort, you must wave it with lighter or darker colours, according as what you are upon is light or shade.

There is such a way of touching your Draperies, so as to distinguish the filken from the woollen; these are more coarse and stiff, the others are finer, and more free or glossy; but it must be remember'd, that these are effects which depend partly upon the stuff itself, and partly upon the colour of it; and in order to apply them in such a manner as shall be agreeable to the subject and to distance, I shall here discourse on their different qualities.

We have no colour that partakes more with light than white, or that comes nearer to the air, which shews it to be weak and fading; nevertheless you may use it for the nearest parts of your picture, or bring it out towards you, by the assistance of some heavier and stronger colour, or by mingling them together.

Blue is the most fading, or rather the weakest colour of all, whence the sky and distant prospects are of that colour; but it will fade the more, the more 'tis mix'd with white.

Pure black is the heaviest and most terrene of all, and the more you mix it with other colours, the more they will be of the same nature.

Now the different natures of black and white produce different effects in them; for often the white throws back the black, and the black brings forward the white. Under white we here comprehend all the light colours, and under black we suppose all that are heavy.

Ultramarine is then a colour weak and light.

Oker is not quite so much.

Masticote is very light, as also verditer.

Vermilion and carmine are next to them.

Orpiment and gambooge are something less so.

Lake holds a mean more kind than rude.

### Of COLOURS for DRAPERY.

1. For *scarlet* garments. Take *vermilion* deepened with *cinnabar* and heightened with touches of *masticote*.

2. For *crimson*. Lay on *lake* very thin, and deepen with the same.

3. For *purple*. Grind *lake* and *smalt* together, or take *blue-bice* and mix it with *red* and *white-lead*.

4. For an *oriental violet*. Grind *litmose*, *blue-smalt* and *ceruss*, but let the *blue* predominate in the mixture.

5. For



5. For *yellow*. Take *masticote* deepened with *brown oker* and *red-lead*.

6. For a *carnation*. Grind *cerufs* well wash'd with *red-lead* or *cerufs* and *vermilion*.

7. For a *straw* colour. Take *masticote*, then white heightened with *masticote* and deepened with *pink*, or thus; take *red-lead* deepened with *lake*.

8. For *yellowish*. Take thin *pink* deepened with *pink* and *green*.

9. For a *light purple*. Mingle *cerufs* with *log-wood* water, or take turnsole mingled with a little *lake*, *smalt* and *pica*.

10. For *blue*. Take *azure* deepened with *Indy-blue* or *lake* heightened with *white*.

11. For a *light blue*. Take *blue-bice*, heightened with *cerufs* or *spodium*.

12. For a *sky-colour*. Take *blue-bice* and *Venice cerufs*, but if you would have it dark, take some *blue* and *white*.

13. For a *pure green*. Take *verdegreafe*, bruise it and steep it in muscadine for twelve hours; then strain it into a shell, to which add a little *sap-green* (but put no gum thereto.)

14. For a *popinjay-green*. Take a perfect green mingled with *masticote*.

15. For a *peach colour*. Take *brasil* water, *log-wood* and *cerufs*.

16. For a *black velvet*. Lay the garment first over with *ivory-black*, then heighten it with *cherry-stone-black* and a little *white*.

17. For *black sattin*. Take *cherry-stone-black*, then white deepened with *cherry-stone-black*; and then lastly *ivory-black*.

18. For *white sattin*. Take first fine *cerufs*, which deepen with *cherry-stone-black*, then heighten again with *cerufs*, and fine touches where the light falls.

19. For a *russet sattin*. Take *Indy-blue* and *lake*, first thin, and then deepened with *Indy* again.

20. For to shadow *russet*. Take *cherry-stone-black* and *white*, lay a light *russet*, then shadow it with white.

21. For a *changeable silk*. Take water of *masticote* and *red-lead*, which deepen with *sap-green*.

22. For a *hair*. It is made out of *masticote*, *umber*, *yellow oker*, *cerufs*, *oker de luce* and *sea-coal*.

23. For a *fire colour*. Take *masticote* and deepen it with *masticote* for the flame.

24. For *cloth of gold*. Take *brown oker* and liquid *gold water*, and heighten upon the same with small strokes of *gold*.

25. For a *walnut colour*. Take *red-lead*, thinly laid, and shadow with *Spanish brown*.

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26. For a *tree*. Take *umber* and *white*, wrought with *umber* deepened with *black*.

27. For the *leaves*. Take *sap-green* and *green-bice*, heighten with *verditer* and *white*.

28. For *banks*. Take thin *umber* deepened with *umber* and *black*.

29. For *water*. Take *blue* and *white* deepened with *blue*, and heightened with *white*.

30. For *feathers*. Take *lake* frizzled with *red-lead*.

To take the perfect DRAUGHT of any PICTURE. Take a sheet of fine *Venice* paper, wet it all over with linseed oil on one side, then wipe it off as clean as you can; let the paper lie by till it is thoroughly dry; then you may lay it on any painted or printed picture; then with a black lead pencil you may draw it over with ease, put this oil'd paper upon a sheet of clean white paper, and with a little pointed stick or feather out of a swallow's wing, draw over the strokes, which you drew upon the oil'd paper; and so you will have the exact form upon the white paper, which may be set out with colours at pleasure.

2. Or thus; having drawn the picture as before in the oil'd paper, put it upon a sheet of white paper, and prick over the drawing with a pin; then take some small coal reduc'd to a fine powder, and wrap it in a piece of fine linen, and tie it up loosely and dab it lightly all over the prick'd line by little and little, and afterwards draw it over again once or twice, with the pen or pencil.

3. Or thus; rub a sheet of white paper all over with black-lead on one side, or else with *vermilion* mixt with fresh butter, lay the colour'd side on a sheet of white paper; then lay the picture you would copy out upon the other side of the colour'd paper, and with a swallow's quill or small pointed stick, go over all the strokes of the picture, and it will be exact on the white paper.

4. Or thus; lay a piece of lanthorn horn upon the picture, then draw the strokes of your picture with a hard nip'd pen upon the horn; and when it is dry breathe upon the horn twice or thrice, and press it hard upon white paper a little moistened.

5. Or thus; take an oil'd sheet as at the first section, rub one side of it with lamp-black or lake, lay it upon a fair paper with the colour'd side downward, and upon it lay the picture you would copy out, and trace it over with a swallow's feather.

6. Or thus; take fine lake mixt with linseed oil and draw with it, instead of ink, all the out-strokes of any picture, and other material parts; then wet the contrary side of the picture, and press it hard upon a sheet of paper, and it will leave behind it all that which you drew over.

7. Or

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7. *Or thus*; grind printer's black fine and temper it with water, and with a pen dipt in it, draw over the out-lines and master strokes; then wet some white paper with a sponge or the like, and press it hard upon it, and you will have the strokes you drew upon white paper.

8. *Or thus*; lay the print (the backside of it) upon a clear glass or oil'd paper; then lay a clean paper upon the print, hold it up against the light, so will you see all the strokes, which you may draw out and shadow also if you please.

### *Of the imitation of DRAUGHTS.*

I. A learner ought to acquire a habit of imitation by many and often trials; which if it be to be done with the pen, take care to avoid scratching and making thin and lean strokes, but rather broad ones drawn from above downwards; but some of the hatches must be sharp, some broad, some unequal, some equal according to the shades.

II. Hold the pen or pencil somewhat long (and not so upright, as is usual in writing) seeming as though you laid it strait forward, and if you draw with pastils use yourself to turn them in your hand; and this will hinder their growing blunt so soon.

III. In shadowing a draught you must begin first to do it faintly and smoothly, and strait against the edges of the light, so that it may look as if it had been dash'd with a brush pencil; and then overshadow it again here and there farther out in the darkest shades, and adorn it with hatchings, and where any thing more is requir'd, put it in nimbly and clearly by gentle touches, which will add a great grace to the work.

IV. *Doefling* (which is a certain besmearing of the work) is to be done with crayons of red or black chalk, touching the draught easily, all over smoothly and evenly with the points of them, and not with cotton or the like put up into quills, as the practice of some is, though that may be done in some cases, when one work is to be brought into another.

V. If copies be taken (chiefly upon colour'd paper) to make it curious and neat, let the edge of the heightening be smooth'd a little (not with cotton, but) with the like coloured paper, rolled up to a sharp point at one end, and by this means you may take away the sharpness and hardness of the edges, and make them look sweet and pleasant.

VI. In performing these things, a certain kind of washing is sometimes necessary, being done with pencils dipp'd in some coloured liquor, and so laid upon coloured paper; and this is to be done sometimes through the whole work, and sometimes but in part, *viz.* in some principal flat shades, which may be afterwards wrought over with a pen or black chalk, and will look very pleasantly.

VII. This

VII. This washing must at first be done very weak and faint, yet smooth, (without smoothing it at the edges except by a new stroke of the pencil moistened with your tongue; for such smoothing will spoil the work) this first washing being dry, go over your work again, yet only those parts where there ought to be a darker shade; and afterwards again, give some deeper and harder touches, without smoothing, which will very much set your work off.

VIII. Faint shadows and things that are obscure, must be represented as faintly as may be, chiefly upon coloured paper, where the heightening helps you; but take care not to go too often over the shades; lest you spoil them by making them too hard and ill favoured.

IX. In drawing either a draught or the life, first observe the thing in general, in respect to the circumferent strokes; for they are those which bound and contain all the parts of the whole, and without which the particular parts can never be perfectly distinguished, nor represent themselves in their being. This done, then consider in like manner the parts; and supposing the parts each to be a whole, you may come to represent the parts of parts, and by the same means express the whole of any draught whatsoever.

*To take off a DRAUGHT in a standing RED colour for TRACING.* Mix *vermilion* very finely ground with a little fresh butter, and rub it on one side of a clean sheet of paper, till it will bear a slight touch of the finger, without leaving the paper too freely; then use this colour'd paper by laying on your print, and trace every line you please, as is directed in tracing, but the three papers must be pinn'd together at the corners to prevent their slipping; for if any of them should slip, the work would be spoil'd; for if by any means the papers be mov'd out of their place, it is hardly possible to place them right again.

This impression made by tracing will hold without rubbing.

The quilts taken from a swallow's wing are very good for tracing, after they have been lay'd by till they are thoroughly dry.

You may if you please use *carmine* with butter after the same manner; and then your drawing will be of a more beautiful colour, or you may colour a paper with blue bice and butter after the same manner, if you would have your drawing blue.

*The taking DRAUGHTS with RED loose INK.* Mix some *vermilion* finely ground with fair water in a gallipot with some *cotton*, and it will run very freely in the pen, so that one may make as fine strokes as he pleases; then with this mixture draw over all the strokes of your print, imitating both the finer and stronger lines; then dip a sponge in gum-water, with a  
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clean white paper, and while it is wet turn the print upon it, and pressing it well take off the print, and all the strokes will remain upon the clean paper, and as soon as it is dry the *vermilion* will be fixt to it.

This method is us'd by writing masters, when they have a book of writing to be engrav'd, they write with this loose ink, and the engraver turns the written side downwards on the copper plate, first finely covered with white wax, which being very well rubb'd on with an iron-tool us'd by engravers, the impression will remain upon the wax.

*Taking DRAUGHTS with BLUE loose INK.* You may make a loose ink with blue bice and common water; which will run very freely from a pen and will serve for the same use, and is to be us'd after the same manner as the beforementioned red ink.

*To COPY DRAWINGS, &c. to take a drawing with fixt INK.* Take a thin sheet of paper and rub it all over with fresh butter as equally as possible; then dry it well by the fire, and rub the butter'd side with carmine, till it is all equally colour'd, or else you may rub it over with lamp-black or black-lead powder, or with blue bice finely ground.

But care must be taken in the rubbing on any of these colours, that it be done so, that the colour will not come off by a very slight touch of the finger, and they are then fit for the work.

When you would copy a print or design, lay the coloured side of the butter'd paper upon a piece of clean paper, and your print upon the butter'd paper; then with a fine pin or needle, blunted a very little at the point, carefully trace the out-lines of your print copy, and you will have a good copy of it upon the white paper; which may be touch'd up afterwards by crayons of the like colour.

*The proper materials for drawing.*

And these are either black-lead pencils or black-lead fix'd in a port crayon, charcoal, red, black, or white, chalk, pastils or crayons, pens or hair pencils and *Indian ink*.

Black lead is as proper in the beginning to practise after the plain lines, &c. as any other material, the stroke it makes being smooth will please the young learner better than what is effected by charcoal or crayons.

Slope your lead with a penknife to a fine point, that it may cast a small neat stroke, if it is not made into a pencil, then fix your piece of lead into a port-crayon, and whatever you sketch with, accustom yourself from the beginning to hold them long in your hand, that the end of your fingers may be at a much larger distance from the point, than they are from the nip of a pen in writing; and form your strokes with light gentle touches,  
by

by these means they will have a greater command of hand, and your out-line will be more free and bold.

When you begin to practise after limbs and figures, it will be useful to draw the rough sketch with charcoal, the strokes made therewith being easily discharged from the paper.

Your charcoal must be slit into small slender pieces to fix in a port-crayon, for a better conveniency of holding it; you must then sharpen it to a proper point, and with a light hand sketch after your original as correctly as you can; what you disapprove of in this performance may easily be wiped out, by gently brushing that part with a feather or clean rag.

Your out-lines being secured with your charcoal, wipe them in a slight manner with a feather that it may appear faint, then go over your lines with your black or red lead, making them yet more correct if you can; when this is done, if upon reviewing it there appears any errors you would amend, you may discharge the paper of what part of the drawing you please, by rubbing that part with the crumb of a stale white loaf, red lead, and red or black chalk, which are us'd in like manner as black lead.

White chalk and tobacco-pipe-clay are us'd in heightening or giving strong lights, and in drawing on coloured paper.

Pastils or crayons are any colours mixt with tobacco-pipe-clay, which while soft and in the consistency of a paste, is rolled up in pieces about the thickness of a quill, and two or three inches in length, and then dried; they are generally us'd on colour'd paper, but never in a way of hatching as black or red lead many times are; but the colours are rubbed and wrought one into another in such a manner, that no strokes appear, but the whole looks as if it was done with a brush.

This is a very quick and expeditious manner of drawing, and when the crayons are handled with judgment, they never fail of a delicate softness and fine expression; but this must be observ'd, that the touch of a rude finger unacquainted with the performance, may easily spoil the fine work while only handling it to look on it; therefore it should not be forgot to preserve it in books or under glasses in frames. The grain of the paper on which they are us'd should be a little rough, the crayons working easier and expressing themselves stronger than when the paper is smooth; if it is a little dark or brownish near the colour of whited brown paper, it yields a good relief to the tender parts of the work, by shewing the light strokes of the work. Pens are sometimes us'd in shading draughts, in hatching them with cross strokes, but this is better perform'd with hair pencils and *Indian* ink, which are not only us'd in hatching by strokes, but in shading after a far more expeditious manner, *viz.* by washing, which is the same as in water working with hair pencils and *Indian* ink,



ink, as with hair pencils and water colours. The shades in hatching are effected by lines, and appear in the strokes, which in an engraven print, contrary to this in washing, there does not appear any lines, but the shades look like those in metzotinto print.

*Directions, &c. for a young practitioner in the art of DRAWING.* Draw all your out-lines generally at first very faint with a coal, because if amiss you may rub them out with the feathers of a duck's wing, and by being feint, it may be the easier mended; but if you lean hard and draw very black, it will not easily rub out.

In the next place, be sure to draw all your out-lines right and agreeable, according to the pattern you draw after, before you begin to shadow any part of it.

Then observe to draw those out-lines next to the light very tender and faint.

Likewise observe in all your drawings the rules and proportions prescrib'd in general elsewhere.

After you have drawn one feature, that may serve in some measure for direction how to draw the other, by observing exactly with your eye, being guided by reason, the distance from that to the next feature, making a small mark with your coal where it is to be plac'd, and then draw it and so on to the next.

This observing of the distances is necessary in a whole figure, and in every thing else.

In a figure you observe by the distance from one muscle or joint, or limb to the other, and the same in all things else.

Observe their bigness, their length, their windings and turnings, and also their shadow.

Take care to shadow it next to the light extremely faint, and where you see bold and free touches, be not timorous in expressing the same.

Be sure in drawing of a head by the life or otherwise, that you observe to place the features exactly right upon the cross lines, whether it be a full face or a three quarter one.

As for such heads as fly upwards in *fore-shortening*, there you must observe to make the cross-lines to fly upwards; and in those heads that decline with the aspect downwards, to make them bending in a circular manner and not streight. See the plate in letter H.

After you have the out-lines true, proceed to trace over the same lines with a pen, which you sketch'd out before rudely with a coal, and draw all the out-lines more exactly, and then finish by degrees, by imitating all the hatches that are in the print with your pen.

Observe the distances of one hatch from another with all the crossings, turnings and windings, and be not timorous in following any of them; but bold and free.

*Of*



## D R A

Of DRAWING. *The precepts in general are,*

I. Begin with *plain geometrical figures*, as lines, angles, triangles, quadrangles, polygons, arches, circles, ovals, cones, cylinders, and the like; for these are the foundations of all other proportions.

II. The circle is useful in all orbicular forms, as of the sun, moon, globes, &c. the oval in giving a just proportion to the face, and mouth, &c. the square confines a picture you are to copy, &c. the triangle is of use in drawing a side or half face; angles and arches in perspective, and the polygon in ground-plats, fortifications, &c. the cone in spires, steeples, tops of towers, &c. the cylinder in columns, pillars, pilasters, &c.

III. Having brought your hand to be fit and ready in general proportions, enure your self to give every object its due shade according to its concavity or convexity, and to elevate or depress the same, as the object appears either nearer or farther off the light, which is indeed the life of the work.

IV. The second practice of drawing consists in forming fruits, as *apples, pears, cherries, peaches*, &c. with their leaves; the imitation of flowers, as *roses, tulips, carnations*, &c. herbs, trees, &c. of different kinds.

V. The third in the imitation of beasts, fowls, fishes, &c.

VI. The fourth practice of drawing consists in the imitation of the body of man, with all its lineaments, as head, nose, eyes, ears, cheeks, hands, arms, and shadows, all exactly proportioned, both to the whole and to one another, both as to situation and magnitude.

VII. The fifth is in the drapery, in the imitation of clothing and artificially setting off the outward coverings, habit, and ornaments of the body, either of cloth, stuff, silk, or linen, their natural and proper folds.

VIII. In drawing of all the forms before mentioned, it is requisite to be first perfect in the laying down the exact proportions; secondly, in the general or outward lines, before you proceed to shadowing or trimming the work within.

IX. In mix'd and uncertain forms, where the circle, square, &c. will be of no use (but only the idea thereof in your own fancy) as horses, oxen and the like; you must do it by judgment, and so gain the true proportions by assiduous practice, thus:

Having the shape of the thing in your mind, first draw it rudely with a coal, then with more exactness with a lead or pencil; then peruse it well, and mend it in those parts you find you have err'd, according to the idea you carry in your mind. Then view it over again, correcting the other parts by degrees, to the greatest exactness you possibly can, tho' you do it twenty or more times over.

## D R A

When you have mended it as well as you can by your own judgment, compare it with some good pattern or print of the like kind; and amend it by that, giving every thing its due proportion.

X Having good copies or patterns to draw after, learn to reduce them to other proportions, either larger or smaller, and this by often and many trials.

XI. When the young artist can do the before-mentioned very well, let him begin to practice in drawing, wherein the liberty of imitation is presented in the largest latitude; and this must be attained by much practice, and diligent exercise, and the instructions of a good master.

XII. Let a perfection in drawing be attain'd, before there be any attempts as to colouring and painting; for after the first is attain'd, all belonging to the latter will be easily understood and gain'd by practice.

### *Particular observations as to* DRAWING.

I. If you draw after a print or picture, place it in such a light, that the gloss of the colours may not interrupt your light, but so that the light and your eye may equally and obliquely fall upon the piece; which should be plac'd at such a distance, that upon opening of your eyes, you may view it all at once; the larger the picture is, the greater distance off it should be plac'd, and which must be right before you and a little reclining.

II. Draw all your out-lines at first very faint with a coal, which may easily be rubb'd out with the feathers of a duck's wing, or a crum of bread, which so may be the more easily mended; but will be more difficultly rubb'd out, if you lean hard on your coal, and draw very black.

The out-lines ought to be drawn true and agreeable to the pattern, before you begin to shadow any part of it.

Those out-lines which are next the light, should be drawn very soft and faint; when you have drawn one feature, that should in some measure be a direction to you to draw the other, by observing with your eye the distance from that to the next feature, making a small mark at the place with your coal, and then draw it, and so to the next, till you have drawn the whole figure.

III. Then observe the middle of the picture you would copy, and touch upon the paper with the point of your coal; then observe the more perspicuous and uppermost figures, (if there are more than one) which you are to touch lightly in their proper places. Thus running over the whole draught, you will see, as it were, the skeleton of the piece you would draw.

But

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But, if you proceed without these considerations of what your draught will run to, when you have ended your work, you will be forc'd to draw the same many times over and over again, and perhaps every time to as little purpose; by the tediousness of which, your ingenuity will be dulled or discouraged.

IV. Take care to draw a just and true draught, although you advance in it but slowly; it may be better to bestow two or three days, at times, upon a piece you may think you can do in two or three hours.

V. Having made these out-sketches, view them diligently, if they answer your pattern or not; for the gestures of the life ought to shew themselves eminently in the first and rudest draughts thereof; without which, it is certain your work will be faulty.

VI. When you have view'd these sketches, begin to correct and mend them (wherever you perceive any thing amiss) adding and diminishing by degrees a little here and there wherever you see it vary from your pattern; and by this method it will be brought nearer and nearer to the life.

VII. Observe the distance of one limb, joint, or muscle from another, and the same in all other accidents of the figure, their length, breadth, largeness, thickness, turnings, shadows, &c.

Shadow next to the light very faintly, and where you see bold and free touches, be not timorous in expressing the same.

In drawing a *head* by the life or otherwise, take care to place the features exactly right upon the cross lines, whether it be a full face, or a three quarter face, as you see in the examples.

In *foreshortening*, you must make the cross lines to fly upwards, where they look upwards; but where the aspect is downwards, they must be made downwards in a circular manner.

Having drawn the out-lines true with a coal, then you are to proceed to trace the same lines over again with a pen, drawing them with more exactness; and by imitating all the hatches with their exact distances one from another, their crossings, turnings and windings, with much boldness and freedom perfect your design.

This may easily be done with charcoal, because what is amiss may be wip'd out.

VIII. If you draw after plaister and emboss'd works, chuse a good north light, which light should descend from above, not dilating and scattering it self too much, by which the work may be more pleasantly shaded.

If the room has a south light, place some oiled paper before the window; and if you draw by candle light, make use of a lamp, shaded with oiled paper; for a candle will by burning grow lower and lower, which will cause the shades to change; all which may be avoided by a lamp.

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IX. Place your self about three times as far from the pattern, as the pattern is high, so that your eye may view it in a direct line; then take an observation with a plumb-line, what part of the pattern appears to you, by extending it strait, and how they come in sight one under another, and accordingly take your fundamental sketches, as has been before directed.

X. In order to draw the muscles of a human body, you must have either the life or very good patterns, of which there are a sufficient number to be found in anatomical books, but especially in *Jacob Vander Gracht's* book, compleated with many varieties and curiosities; from whence the alteration and changes, risings and fallings, extensions, contractions, and other operations of the muscles, arteries, and particular members, are in imitation of the life excellently depicted.

XI. In drawing after a naked body, all the muscles are not to be so plainly expressed as in anatomical figures; but that side whose parts are most apparent and of signification in the performance of any action, must be made to appear more or less, according to the force of that action.

XII. In drawing of young persons, the muscles must not appear manifestly so hard, as in elder and full grown persons.

The same is to be observ'd as to fat and fleshy persons, and such as are very delicate and beautiful.

And in women, scarce any muscles at all are to be expressed, because that in the life, they do either not appear at all, or but very little, unless it be particularly in some forcible action; and then too they are to be represented but very faintly, lest the singular beauty of the body be thereby spoil'd. The like is also to be observ'd as to little children.

XIII. The motion of the whole body must be considered in drawing of the muscles; as in the rising or falling of the arms, the muscles of the *breast* do appear more or less. The *hips* do the like, according as they bend outward or inward; and it is the same chiefly in the shoulders, sides, and neck, according to the several actions of the body; all which alterations are first to be observ'd in the life.

XIV. The breadth and largeness of a picture is also to be considered; it should be larger about the legs and garments, shewing it slender above, as it were pyramidically, by discovering one shoulder and hiding the other, which is shortened by turning the body.

XV. But sometimes the figure is to be represented biggest in the upper parts; by representing either both the shoulders, or both the arms, shewing the one leg, and hiding the other, or both of them after one manner, as the discretion of the artist shall see meet.

XVI. Neither

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XVI. Neither ought this to be observ'd only in the whole body, but even in every part; so that in the legs, when a muscle is rais'd outwards on the one side, that which is directly on the contrary side must be drawn in and hid, for so it appears in the life.

XVII. The proportion of the figure ought to be multiplied by degrees, in proportion of one to two, three, four, &c. for herein the chief skill consists; the diameter of the biggest place between the knee and the foot, is double to the least, and the largest part of the thigh triple.

### *Of DRAWING the Face of a Man.*

I. In drawing of a face, the first thing to be done is to observe its motion, whether upwards, downwards, forwards, or sideways; whether it be long or round, fat or lean, big or small.

*For if the face be fat, the cheeks will seem to swell; if lean, the jaw-bones will stick out, and the cheeks fall in; but if it be neither too fat nor too lean, it will be for the most part round.*

II. Touch the features, where the eyes, nose, mouth and chin should stand lightly (after you have first drawn the circle or oval of the face) then make a stroke down from that place which is even with the chin, drawing it down where the middle or tip of the nose and middle of the mouth should be placed, which stroke must be made strait down in a full right face; but arch'd or oval in an oblique face, leaning that way towards which the face turns; then cross that stroke about the middle of the eyes, either with a strait line in a right face or with a curved line, either upwards or downwards, according to the present action or posture of the face; then make another answerable to that, where the end of the nose should come, and another for the mouth, that it be not made crooked.

III. This cross is difficult to be understood in *plano*; but upon a face made upon a solid body in form or shape of an egg, the several variations of the said cross are most excellently demonstrated; and a learner may from hence understand all the variations of a face, and thereby draw it all manner of ways, as upwards, downwards, forwards, backwards, sideways, &c. and that only by the motion of the said oval solid, accordingly as you may easily perceive in the former figures.

IV. Then if the face look upwards towards heaven, or downwards towards the earth, let the eyes, nose, mouth, and brows look accordingly with it; and next proceed to the placing of the features.

V. In a face of a just proportion, the distances; 1st, between the top of the forehead and the eye-brows; 2d, between the eye-brows and bottom of the nose; 3d, between the bottom of the nose and the bottom of the chin are equal,

VI. In

## D R A

VI. In drawing the utmost circumference of a face, take in the head and all with it, lest you should be deceiv'd in drawing the true bigness.

VII. Then you are to consider all those chief touches, which give life to a face, adding a grace to it, and something that shall also discover the disposition of the mind.

So the *mouth* extended, and the corners turning a little up, shews a smiling countenance.

The eye-brows bending, and the forehead and top of the nose, between the eye-brows wrinkled, represents a frowning countenance.

The upper *eye-lid* coming something over the ball of the eye, shews a sober and a staid countenance.

There are also many other touches which give life and spirit to a face, which you may find out by degrees, by good observation of good prints.

VIII. The distance between the eyes should in a full face be the length of one eye; but it is to be lessened proportionably in a three quarter or half face; and the nostrils must be plac'd exactly under the corners of the eyes.

IX. When you have given touches where the eyes, nose, mouth and chin are to be plac'd, then begin to draw them more exactly, and so proceed till you have finish'd the face; after which, draw the hair, beard, shadows, and other things about it.

X. You must take great care to place the shadows right, and be sure not to make them too dark, where they should be faint; because they can never be rendered lighter afterwards, and so the whole face will be spoil'd.

*You must remember that the shadows must be more faint and light in a fair face than in a swarthy one.*

XI. When you have finish'd the face, give here and there some hard touches with your pen, where the shadows are to be darkest; then proceed to the ears and hair, first drawing the ~~out~~-line, and afterwards the principal curls or master-strokes in the hair; and these will be a guide to you as to the lesser curls, which depend upon the first; taking care to make the curls to bend exactly, according to the pattern that they may lie loosely or carelessly, and not stiff and forced; having drawn the curls, strike in the loose hairs, which hang scatteringly out of the circles.

XII. In forming the ear, describe an oval as it were, and proceeding lightly, join stroke to stroke in such manner as you see in the figures, so that the ear may be intirely form'd, without any digression from the bounds of nature or art.

XIII. In



## D R A

XIII. In the last place, having practis'd by rule till you have brought your hand in, in drawing of any thing, first stroke the out-lines, the principal veins and muscles lightly, and shadow them afterwards, always making use of the best copies or prints, which will both encrease your judgment, and bring you to a good command of hand.

### *Of DRAWING the extreme parts.*

I. In drawing the *hands*, don't draw all the joints, veins, or other things to appear plainly, but only lightly and faintly ; and strike out the size of the hand and the manner of its turning with faint touches, and not with hard strokes.

II. After you have done this, part the fingers according to your pattern, with faint strokes also ; then mark the place where any of the fingers stand out from the others with a faint resemblance.

III. Having done this, proceed to draw these parts more perfectly, making the bending of the joints, the wrists, and other principal parts more exactly ; then go over them again, drawing every small bending or swelling of the fingers, nails, knuckles, and veins, so many of them as do appear.

IV. Acquaint your self from good prints, with the just proportions of the hands, with their equal distances, always observing this rule, that according as it turns, either one way or the other, to shorten in proportion as they appear to the eye.

For so much as it turns away from our eye, so much it loses in proportion ; nay, sometimes a whole finger, two or three, or more, is lost to our sight, to which the draught must be made to answer.

V. In drawing of feet, the same rules are to be observ'd, that are laid down for drawing of hands.

### *Of DRAWING the whole body.*

I. Begin with the head, and be sure that you give it its just proportion, answerable to what you intend the whole body shall be ; then draw the shoulders in their exact breadth, next to them the trunk of the body, beginning at the arm pits, and so drawing down to the hips on both sides, observing withal the exact breadth of the waste ; and in the last place, draw the legs, arms and hands, according to your pattern.

II. First draw with a coal, and also very lightly and faintly, not drawing any thing perfect (that it may be the easier mended when it is amiss) and when this has been done, finish one thing after another as curiously as you can.

III. Let those joints, sinews, muscles and veins which are parallel, be plac'd opposite to one another in a strait line (as shoulder to shoulder, hip to hip, knee to knee, &c.) in order to this, draw strait cross lines for your guide ; observing that which  
way



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way soever the body turns or bows, these lines may answer accordingly.

IV. Place all perpendicular joints and parts in a right line one under another (as you see them in your pattern.) For which purpose, draw a strait line (if the body be strait) from the throat, through the middle of the breast and privities to the feet, to which line draw all those particular points parallel, that the body may not appear crooked or awry.

V. In the bowings and bendings of the body, let the extuberance of the outward part be just equal to the compression of the inward part, making all things of an equal proportion, that the opposite parts may be equal (as arm to arm, leg to leg, &c.) so every part may be proportional to each other (as the hand not too big for the arm, nor the arm for the body, nor the body for the legs, &c.) only with this difference, that (as the one part may appear fully to the eye, or the other may turn away, either in part or the whole, or be seen sideways) it may be made so much less than the other, by so much as it turns away from the sight.

VI. As a just proportion is to be observ'd in bigness, so also must it in length, so that every opposite part may not be too long one for another, but according to the propos'd magnitude; and in this case, that if the body be awry, or any ways hid, those parts may shorten accordingly, to what is out of sight.

VII. The just distance of one thing from another, for by that means you will be more exact in your draught, and be able in a little time to imitate either pattern or nature more perfectly.

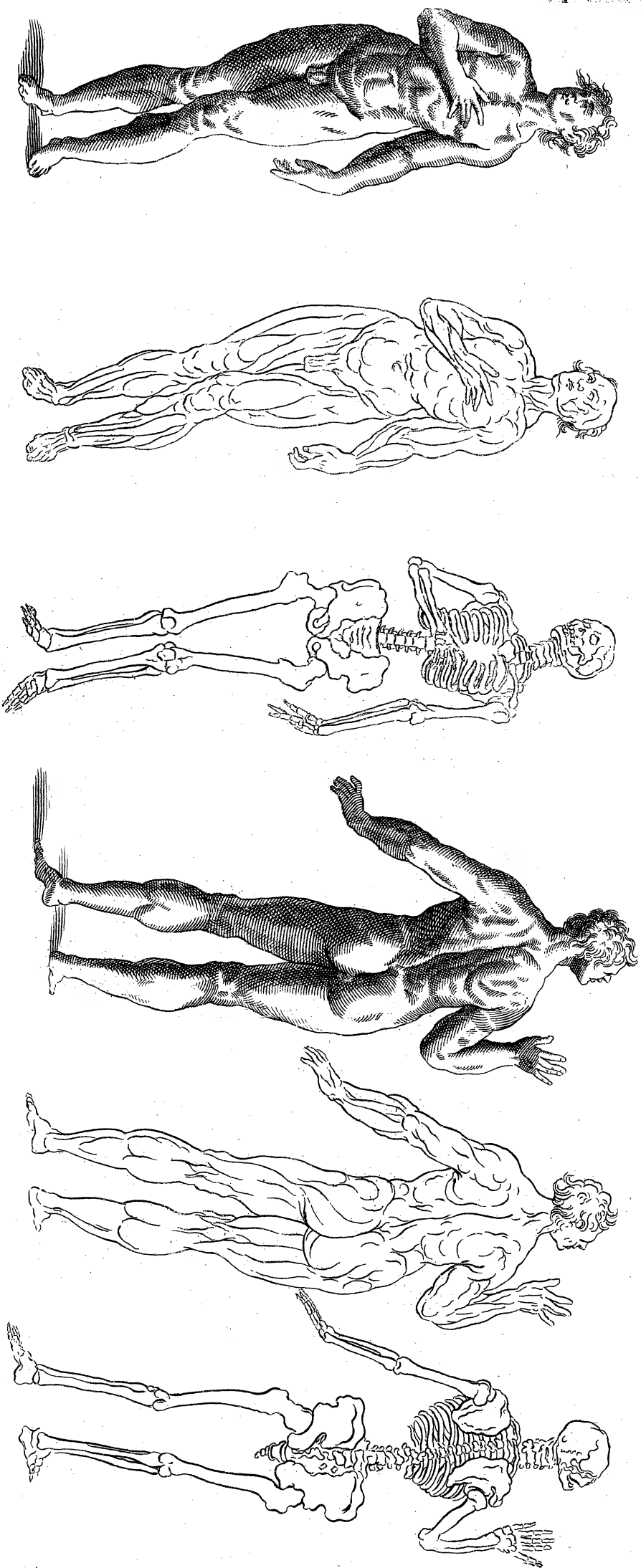
VIII. If you draw a labouring man, you must represent him with strong limbs and rais'd muscles, swelling and standing out; especially in bearers of burthens, drawing of weights, leaping, walking, combating with weapons, or such like violent exercises.

IX. In representing persons asleep, you must carefully avoid giving any such posture or actions in their lying, as will not, in all probability, give them leave to sleep. For the weaknesses and want of judgment in the artist, will appear in representing their limbs or bodies supported by their own force, and not by the help of some other thing.

*Of DRAWING a NAKED BODY.* In drawing after the life, as there are a great variety of faces, so no certain rules can be delivered for it; yet the following precautions may be of use.

I. Draw the *head* in an oval, one fourth part for the hair, one fourth part for the forehead and brows, one fourth for the nose, and the last for the mouth and chin.

II. Having





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II. Having drawn the head, measure out eight times the length of it (the head making one of the eight parts) and draw a strait line from the top of the head to the sole of the foot.

III. Let there be one head's length from the chin for the breast, and the next eighth part will reach to the navel, the fourth part to the privities, the fifth part to the middle of the thigh, the sixth part to the lower part of the knee, the seventh to the small of the leg, and the eighth part to the heel.

IV. You must take care to draw the muscles exactly as they are in the life; the breadth of the shoulders should be about two measures of the head, the breadth of the hips two measures of the face; the arms as stretched out to their full length, are just the length of the whole figure, the breasts also accounted; but without the breasts they are but six.

V. The arms, when they hang strait down, reach within a span of the knee; the length of the hand is the just length of the face.

VI. Let the head be drawn first with the utmost exactness, and next to that the shoulders in their just breadth, after these draw the trunk of the body, and the rest in order as before directed.

VII. Let the joints, muscles, sinews, &c. be all placed in their proper and natural places, and also be proportionable as to magnitude, similitude and parts, lest it seem crooked and deform'd.

VIII. Let every parallel joint have a moderate bending so as to answer its opposite in nature.

IX. It will be of great advantage to practise much drawing after the life, and after good prints of anatomy and statues made of plaister of *Paris*, which is the only way to arrive at the perfection of drawing a naked figure well.

X. A picture ought also to be quick, free and lively; and if there be many of them in one piece, they ought to be so ordered as not to appear crowded, or to fall offensively; but being dispos'd gracefully (on the fore ground especially) so to manage the whole, that the rest of the figures decline and lessen proportionably and gradually, both in magnitude, height and strength according to their several distances.

### DRAWING of *mixed and uncertain* FORMS.

1. In order to the drawing the form of any beast, begin at the forehead with the lead or coal, drawing downward the nose, mouth, upper and nether chop, ending the line at the throat.

2. Then viewing it again where you begun, from the forehead over the head, ears and neck, continuing till you have given the full compass of the buttock; then mark out the legs and feet.

3. Viewing

3. Viewing it again, touch out the breast with the eminency thereof; lastly finish the tail, paws, tongue, teeth, beard and several shadows.

4. In drawing beasts, you must be well acquainted with their shape and action, without which you will never perform any thing excellent in that kind; and here if you draw it in an emblem or the like, you ought to shew the landscape of the country natural to that beast.

5. In birds begin also the draught at the head (and beware of making it too big) then bring the breast line, from under the throat, down to the legs, there stay and begin at the pinion to make the wing, which being joined to the back-line, will be presently finish'd.

6. The eye, legs and train must be drawn last, always letting (in birds as in beasts) the farthest leg be shortest, their feathers are the same to them as the hair in beasts, and therefore must take their beginning at the head very small, and fall in one way backwards in five ranks, greater and greater to the conclusion.

7. *Insects*, as flies, bees, wasps, grass-hoppers, worms and such like are easily to be drawn and not hard to be laid in colours; in doing these it will at first be absolutely necessary to have the living pattern before your eyes.

8. To draw a flower begin from the rose-tuft or wart in the middle, as in a rose or marigold, with the yellow tuft, which being made, draw lines equally divided from thence to the greatest compass or extent of the flower.

9. They may be drawn either fully open or in the bud, and laden with dew, wet and worms, and then with the coal or lead, may be drawn rudely the leaves, giving them afterwards their veins or jaggedness.

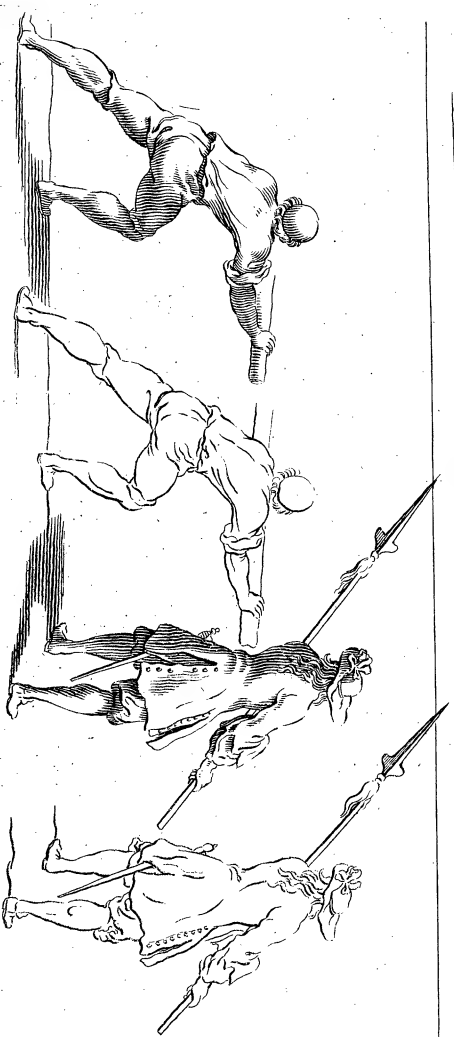
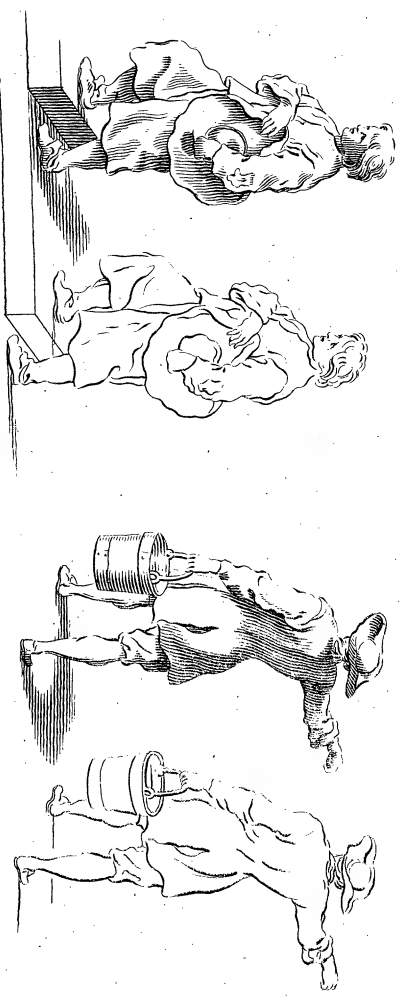
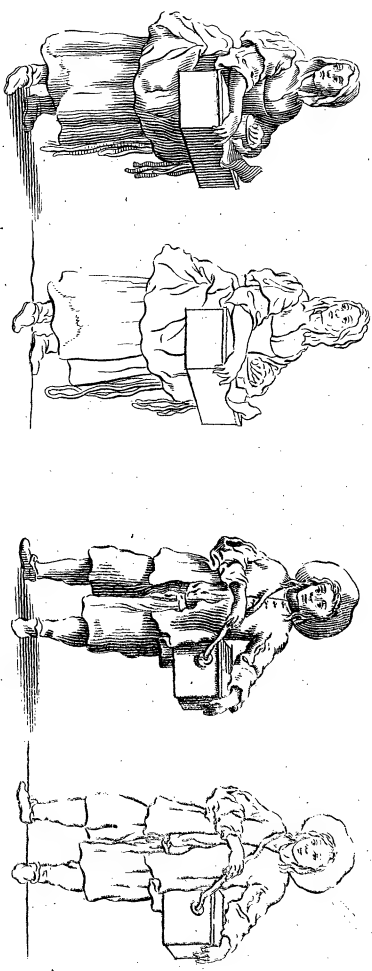
10. To take the natural and lively shape of the leaf of any herb or tree.

*First take the leaf you would have, and gently bruise the ribs and veins on the backside of it, afterwards wet the side with linseed oil; and then press it hard upon a piece of clean white paper, and so you shall have the perfect figure of the said leaf with every vein of it so exactly express'd, as being lively coloured it will seem to be truly natural.*

#### General observations on DRAWING.

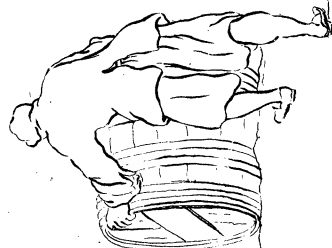
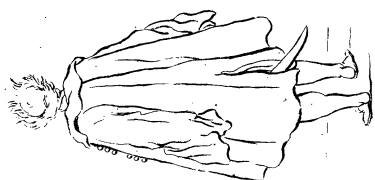
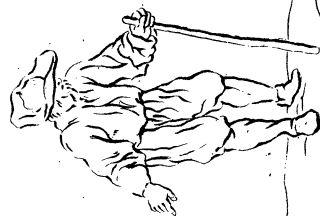
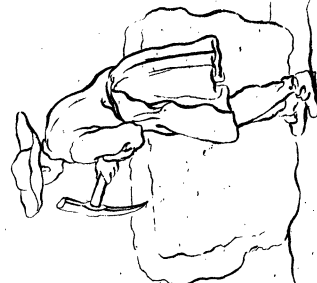
1. In drawing well you must endeavour to make your compositions conformable to those of the ancients, and their customs, yet having respect also to the present times.

2. Avoid whatsoever has no relation to the subject in hand, or that may not be proper to it, nor must you put into principal places,











places, such things as have but a small relation to it; those being to be reserv'd for the minutes of the design.

3. In pictures neither the face, proportion, age nor colours are to be alike in all, but they are to be as different, as the true and living objects themselves are.

4. Let your subject be beautiful and noble, furnish'd with delights and charms, elegant, and pleasing.

5. Let your invention be good, and the postures of your design agreeable and harmonious in respect to light and shadow, with the colours which are afterwards to be added, taking from each what may most conduce to the beauty of the work.

6. The principal part of the picture ought to appear in the middle of the piece under the strongest light, that it may be more remarkable than the rest, and not be hidden or obscur'd from the sight by other adjacent figures; yet so that all together may compose but one body with the drapery proper for the same.

7. All the members or parts of the figure ought to be combin'd or knit together in a kind of harmony, as the portions of the same part are, that no chasm may appear to be left, which will disgrace the work.

8. If there be crouds or heaps of objects, let them be made distinct by different postures and motions, which ought not to be alike, any more than their parts, nor ought they to be all on one side, but set as much as may be in opposition one to the other.

9. If among many figures, some shew their fore-parts, let others shew their hinder parts, opposing as it were the back or buttocks to the belly.

10. And if the piece contain many figures, let not one side of it be void or empty, while the other is fill'd to the borders; but let the parts and matter be so dispos'd, that both sides may equally participate of the amplitude of the design.

11. Let there not be too many figures in your piece, for it will not be possible to dispose and introduce them into the work with such a grace, as may make the whole beautiful.

12. Because many dispers'd objects breed confusion, detracting from the work that elegancy and pleasingness which ought to give pleasure to the beholder.

13. But if the work is to consist of many figures, you ought to conceive the whole design in your mind together; that when it is perform'd it may appear at the first view, as the product of perfect harmony, and as the real work of nature.

14. Such parts as are not easy to be seen, and are not natural and all forc'd actions and motions, also uncomely postures and parts, are to be wholly omitted.

15. You

15. You should also avoid all out-lines, and other lines, which are either equal or parallel, or constitute any pointed or geometrical figure, whether triangles, squares, quinquangles, hexangles, &c. which by their exactness or seeming exactness spoil the natural beauty, and give displeasure to the eye.

16. You are not to tie yourself up too strictly to nature, but sometimes you may give a loose to the flights of fancy and your own genius; by which many times things are added to render the design much more beautiful.

17. Yet the beauties of nature are to be imitated, as has been done by the ancients; for which reason the whole universe is to be view'd and contemplated, to furnish the mind with great and noble ideas, with which the work being adorn'd, they may be as so many charms upon the senses, &c. of the beholders.

18. If the piece has but one single figure, it ought to be perfectly finish'd in all its parts; the drapery sweetly spread over it, the folds large and following the order and motion of the parts, that they may be seen, as it were, *underneath* by the lights and shadows appendant.

19. If the parts be too much distant from each other, so that there are void spaces left, place there some fold or folds which must be deeply shadowed, to constitute a seeming joining (as it were) of the parts.

20. The beauty of drapery consists not in the multitude of the folds, nor the beauty of limbs in the quantity and rising of the muscles; but rather in their natural order and simplicity.

21. The management of the *drapery* is to be taken from the quality of the persons, if it be of a clown or slave, it ought to be concise and short; if of magistrates, bold and ample; if of ladies, light, sweet and soft.

22. Folds are sometimes to be drawn out from hollows and deep shadows, to which you are to give a swelling, that receiving the light, it may, as it were, extend the clearness to those places where the body requires it, and so those hard shadowings, which are ever ungraceful, will be avoided.

23. In laying the scene of the picture, you are to consider the places suppos'd, the countries where brought forth, the manner of their actions, with the use and customs belonging to them.

24. You are to follow the order of nature; as in drawing or painting clouds, lightening, sun-shine, &c. to place them towards the top of the piece, not towards the bottom; and contrariwise in putting-wells, waters, caves, foundations, &c.

25. The lights and shadows of round bodies ought to be lively and strong, but in their turnings, they ought to lose themselves insensibly, and confusedly, without a sudden or abrupt precipitation of the light, all of a sudden, into the shadow, or the shadow into the light,

26. But

26. But the passage of one into the other ought to be easy, sweet and imperceptible, that is, they are to change gradually the light to slide (as it were) into the shadow, and the shadow into the light.

27. In the same manner, as if you would manage a single head or figure, you must (in conformity to these precepts) draw a heap of figures compos'd of several parts.

28. And where you have several heaps of figures (which ought not to exceed three or four) you must take heed, so to place or separate them from each other, that they may be plainly distinguish'd, by lights, shadows or colours.

29. And these things ought to be manag'd so dextrously, that the bodies may appear inlightened by the shadows, which bound the light and not be permitted suddenly to go farther; and on the contrary the shadows should be made evident, by enlightening the ground.

30. A round body should be drawn in the same manner that we behold it in a convex mirrour, in which the figures and all other things are seen to bear out with more life and strength, than even nature herself.

DRAWING, } By these terms are sometimes understood  
DESIGNING, } the expressing our thoughts upon paper, or whatever other flat superficies; and that by resemblances form'd by a pen, crayon, chalk, or the like. But more commonly, the giving the just form, and dimension of visible objects, according as they appear to the eye; if they are pretended to be describ'd in their natural dimensions; if not, but bigger or lesser, then *Drawing* or *Designing*, signifies only the giving those things their true form, which implies an exact proportionable magnifying, or diminishing in every part alike.

And this comprehends also giving the true shapes, places, and even degrees of lights, shadows, and reflections; because if these are not right, if the thing has not its due force or relief, the true form of what is pretended to be drawn cannot be given; these shew the out-lines all round, and in every part, as well as where the object is terminated on its back-ground.

In a composition of several figures, or whatever other bodies, if the perspective is not just, the *Drawing* of that composition is false. This therefore is also imply'd by this term. That the perspective must be observ'd in the *Drawing* of a single figure cannot be doubted.

I know *Drawing* is not commonly understood to comprehend the *clair obscure*, *relief*, and *perspective*, but it does not follow, however, that what I advance is not right.

But if the out-lines are only mark'd, this also is *Drawing*; 'tis giving the true form of what is pretended to, that is, the out-line force.

The *Drawing* in the latter, and most common sense, besides that it must be just, must be pronounc'd boldly, clearly, and without ambiguity; consequently, neither the out-lines, nor the forms of the lights and shadows must be confus'd, and uncertain or woolly, (as painters call it) upon pretence of softness; nor on the other hand, may they be sharp, hard or dry; for either of these are extremes; nature lies between them.

As there are not two men in the world, who at this instant, or at any other time, have exactly the same set of ideas; nor any one man that has the same set twice, or this moment, as he had the last: for thoughts obtrude themselves, and pass along in the mind continually as the rivers stream, and perpetually draw their humid train; *Milt.* So neither are there two men, nor two faces, no, not two eyes, fore-heads, noses, or any other features: nay farther, there is not two leaves, though of the same species, perfectly alike.

A *Designer* therefore must consider, when he draws after nature, that his business is to describe that very form, as distinguish'd from every other form in the universe.

In order to give this just representation of nature, for that is all we are now upon, as being all, that *Drawing*, in the present sense, and simply considered implies; (*grace* and *greatness* is to be spoken of afterwards) I say in order to follow nature exactly, a man must be well acquainted with nature, and have a reasonable knowledge of *geometry*, *proportion*, (which must be varied according to the sex, age, and quality of the person) *anatomy*, *osteology*, and *perspective*. I will add to these, an acquaintance with the works of the best painters and sculptors, ancient and modern; for 'tis a certain maxim, no man sees what things are, that knows not what they ought to be.

That this maxim is true, will appear by an academy figure drawn by one ignorant in the structure, and knitting of the bones, and anatomy, compared with another who understands these thoroughly; or by comparing a portrait of the same person drawn by one unacquainted with the works of the best masters, and another of the hand of one to whom those excellent works are no strangers; both see the same life, but with different eyes; the former sees it, as one unskilled in musick hears a consort, or instrument, the other as a master in that science; these hear equally, but not with like distinction of sounds, and observation of the skill of the composer.

Perhaps

Perhaps *Albert Durer* drew as correctly, according to the idea he had of things, as *Rafaëlle*, and the *German* eye saw (in one sense) as well as the *Italian*; but these two masters conceiv'd differently; nature had not the same appearance to both, and that because one of them had not his eyes opened to see the beauties that are really there.

*Michael Angelo* was the most learned, and correct designer of all the moderns, if *Rafaëlle* were not his equal, or as some will have it superior. The *Roman* and *Florentine* schools have excell'd all others in this fundamental part of painting; and of the first *Rafaëlle*, *Giulio Romano*, *Polydore*, *Pierino del Vaga*, &c. as *Michael Angelo*, *Leonardo da Vinci*, *Andrea del Sarto*, &c. have been the best of the *Florentines*. Of the *Bolognese*, *Annibale Carracci*, and *Dominichino* have been excellent designers.

When a painter intends to make a history (for example) the way commonly is to *Design* the thing in his mind, to consider what figures to bring in, and what they are to think, say or do; then to sketch upon paper this idea of his, and not only the *invention*, but *composition* of his intended picture: this he may alter upon the same paper, or by making other sketches, 'till he is pretty well determin'd as to that; (and this is that first sense in which I said the term *Drawing* or *Designing* was to be understood.) In the next place his business is to consult the life, and to make *Drawings* of particular figures or parts of figures, or of what else he intends to bring into his work, as he finds necessary; together also with such ornaments, or other things of his invention, as vases, friezes, trophies, &c. till he has brought his picture to some perfection on paper. This is frequently done, and sometimes these *drawings* are finish'd very highly by the master, either that his scholars might be able from them to make a greater progress in the grand work, and so leave the less for himself to do; or because he made advantage of such *drawings* from the person who employ'd him, or some other; and perhaps sometimes for his own pleasure.

Of these *drawings* of all kinds, those great masters made a great many; sometimes several for the same thing, and not only for the same picture, but for one figure, or part of a picture; and though many are perish'd and lost, yet a considerable number have escap'd and been preserv'd to our times, and these are exceedingly valued by all who understand, and see their beauty, for they are the very spirit and quintessence of the art; there we see the steps the master took, the materials with which he made his finish'd paintings, which are little other than copies of these, and frequently (at least in part) by some other hand; but these are undoubtedly altogether his own, and true, and proper originals.

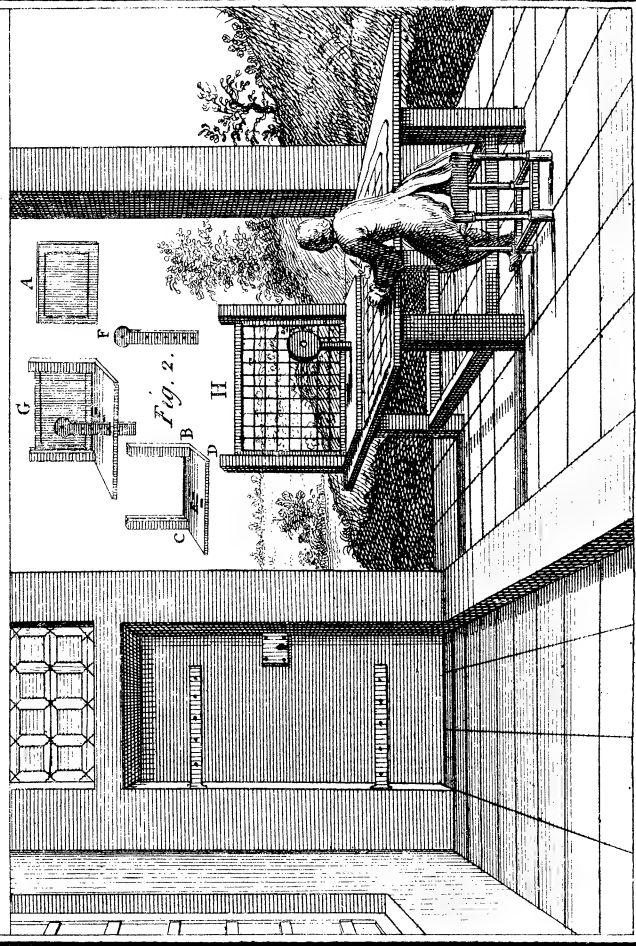
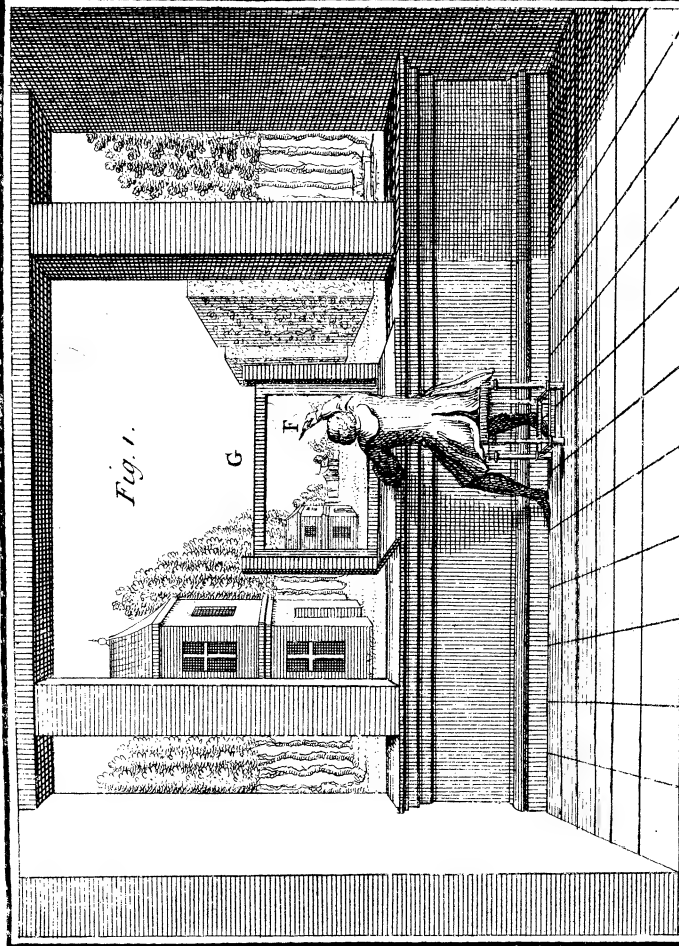


It must be confess'd, in the paintings you have the colours, and the last determination of the master, with the entire completion of the work. The thoughts and finishings are in a great measure seen in the prints of such works of which prints are made, nor is a *Drawing* destitute of colouring absolutely; on the contrary, one frequently sees beautiful tints in the paper, washes, ink, and chalks of *drawings*; but what is wanting in some respects is abundantly recompensed in others; for in these works the masters not being embarrass'd with colours have had a full scope, and perfect liberty, which is a very considerable advantage, especially to some of them. There is a spirit and fire, a freedom, and delicacy in the *drawings* of *Giulio Romano*, *Polydore*, *Parmeggiano*, *Battista Franco*, &c. which are not to be seen in their paintings: a pen or chalk will perform what cannot possibly be done with a pencil; and a pencil with a thin liquid only what cannot be done when one has a variety of colours to manage, especially in oil.

And there is this farther consideration to endear those *drawings* we have to us; no more can be had than what are now in being; no new ones can be made; the number of these must necessarily diminish by time, and accidents, but cannot be supply'd; the world must be content with what it has: for though there are ingenious men endeavouring to tread in the steps of these prodigies of art, whose works we are speaking of, there is yet no appearance that any will equal them; though I am in hopes that our own nation does, or will produce those that will come as near to them as any other, I mean as to history-painting, for that we excel all others in portraits is indisputable.

I shall only add, that the first sketches not being intended to express more than the general ideas; any incorrectness in the figures, or perspective, or the like, are not to be accounted as faults; exactness was not in the idea, the sketch, notwithstanding such seeming faults, may shew a noble thought, and be executed with a vast spirit, which was all pretended to, and which being perform'd, it may be said to be well drawn, although incorrect as to other matters. But when correction is pretended to, (and this is always the case of a finish'd *Drawing* or picture) then to have any defect in *Drawing*, in this sense of the term, is a fault.

*A very curious method of DRAWING all PERSPECTIVE in the most natural manner, without observing the rules.* It may be of good service to such as love painting; and take pleasure in practising the same, without being willing to be at the pains of opening the compasses or taking up the ruler to draw lines. For in this method neither the one nor the other are requir'd; and yet the finest draughts may be made hereby of buildings, gardens, landscapes, &c. See plate, fig. 1. Before





## D R A

Before we come to the method itself it must be observ'd that the principal requisite therein is a large piece of fine clear glass, fitted into a fine wooden frame, express'd at the bottom of the plate by letter A.

This frame is to slide between two cheeks or pieces of wood an inch and half thick, which are rais'd at the two extremes of a board the breadth of the frame, i. e. about a foot broad, as shewn in B C, which is dispos'd to receive the frame A.

In the middle of the board one or more square holes must be made as in E to receive the slit ruler F, so as it may be rais'd or lowered at pleasure. At the top of which ruler is a circle of three or four inches diameter; but no thickness, being made of tin or the like and having a little aperture about the size of a pea in the middle, the whole is represented together in G.

Now though the mere figure shews the application, yet I will describe the method of proceeding.

Having therefore plac'd the instrument G before the object you would draw, look through the little hole or sight F, and if you see all the propos'd objects represented on the glass, the instrument is fix'd, otherwise bring the sight nearer the glass, till you see the whole of what is requir'd.

The piece being thus rectified, you are to draw on the glass every thing that you see thereon through the hole F, which has the same effect here as the point of sight in other methods. And it is certain, that every thing thus drawn on the glass, the eye being fix'd to the little hole, will be according to the strict rules of perspective.

Every body knows how to take or copy off what is thus design'd on the glass. 'Tis best to draw the lines and figures on glass with pen and ink; then wetting the back side of the glass a little, and laying a moist sheet of paper on the side that has the design; rub or press the paper gently thereon, and the whole draught will be imprest or transferr'd from the glass upon the paper.

Some advise to make use of a pencil and colours; but in short every body is left to their own discretion, it is enough to know the method in general.

A design of a palace is as easily taken this way as a landscape; and a church as a house or chamber; all requir'd in any of them being to pitch on a place where the whole thing to be represented may be seen; and to bring the sight to the proper nearness to the glass. A painter may use the same method for the drawing of figures, postures, &c. from nature, statues, relievo's, and in short every thing; it being certain that a little practice will render the method exceeding feasible and easy. See plate, fig. 1, 2,

## D R A

*Another elegant manner of DRAWING in perspective.* This method is as curious as the former; and some even prefer it, by reason there is a double draught requir'd in that; one on the glass, and a second copied or imprinted from it; whereas in the present method, only a single draught is made, and that as exactly as the former.

I shall not describe the structure of this instrument; it being the same with that already mentioned, excepting that the frame instead of the glass fitted in it, must be divided into a number of little squares by fine threads; drawn at equal distances from each side of the frame across each other, forming what we call a *reticula* or lettice. See plate, fig. 2.

As to the number of squares that is left to discretion, all that is necessary to be added, is, that they must not be too large, that you may work the more exactly; nor too small for fear of being confus'd.

For the practice; place the piece H in such manner, as that you may see all the objects you mean to design through the hole of the sight I.

If the design should be larger than the compass of the frame or *reticula*, your chequer squares must be made on the cloth or paper larger than those of the frame.

If the design be intended smaller on the cloth, &c. than the frame, make the squares less; otherwise they are to be of the same size.

But in all the cases make the same number of squares on the paper, &c. as are in the frame when you look through the sight I.

Thus transferring proportionably from the squares in the one to the corresponding ones in the other; the perspective will be as just, as if you had gone by the strict rules, and us'd the compass, ruler, &c.

The two figures shew how the piece H is to be placed in order to design on a table, the expedient is of excellent use in painting, and serves to draw very exactly any perspective draught, to copy paintings, draw to the life, &c. See plate, fig. 2.

### *Short rules for drawing in perspective.*

If we observe the faults daily committed in the designing of landscapes, or drawing views and prospects, the knowledge of something of perspective, in order to correcting and avoiding such errors, for the understanding that art, will render any one capable of drawing any thing with mathematical truth and certainty.

It may reasonably be believ'd, that so many mistakes as are commonly made in drawings proceed from the apprehensions that some have of the length of time, it will take up to render them-

selves masters of perspective, and by being frightened at the difficulties, they conceive are in that study; imagining that it is absolutely necessary that a person must be well grounded in the mathematicks, before he can acquire a competent knowledge in perspective.

This having discourag'd many from engaging the rein, the rules relating to this art, has given occasion to the giving the following lessons, how to lay any plan in perspective, and raise pillars or buildings to due heights according to their proper distances.

*For the first lesson of the plan. See fig. 1.*

Suppose you have a square piece of pavement, as in fig. 1, consisting of twenty five pieces of marble, each a foot square, it must be measured exactly, and laid regularly down upon paper; you may likewise for your better observation, mark every other stone or marble black, which will better inform you how every particular square will appear, when you have a true perspective view of them; or else you may number every one, and when the second or following lesson is done number those in the perspective plan, with the same figures as are mark'd on the first plan.

*Lesson II. of laying the figure 1. in perspective. See plate, fig. 2.*

It is to be understood in perspective, that there are two points to be considered, the first is call'd the point of sight. See POINT of SIGHT in letter P, that is what relates to every thing in our view, from the place where we stand to take our view; for the perspective will still be true, according to the appearance of the plan to our eye; if we stand at a corner, or in the middle, or at any point, the method I shall prescribe presently, will lay the plan justly before you, as it will appear. See plate, fig. 2.

The other point is call'd the point of distance, because it governs the distances, and the proportions of every thing we can truly see of the plan, in whatever position we happen to be. See POINT of DISTANCE in letter P.

At A you see the plan of figure 1, this is divided into squares, as mentioned in that figure, the three at the bottom mark'd B C D, in both, and the squares in the plan A mark'd 1, 2, 3, 4, are those which are mark'd in perspective with the same numbers.

Now to lay your plan in perspective, fix your point of sight, as you observe in the figure, more or less to the right or left as you think proper; then draw the line K K, parallel to, and at what distance you will from the line L L; then raise a line from each side from L to K, to form the figure you see, as a frame to your picture; then draw a line from the corner K, which is the point of distance to L, and this line will regulate the work,

Then draw lines from the squares of the plan to the point of sight, as exactly as possible, and wherever the line of distance cuts those lines, which are drawn from the squares of the plan to the point of sight, that marks where your squares in perspective ought to be; then draw lines parallel to the line L L, where the line of distance cuts, and that will give you the true figure of every square; so D in the perspective plan, answers to D in the measured plan, and 1, 2, 3, 4, answers to the others in the same.

When you have done this, the next rule you are to know, is to know how to raise either pillars, trees, houses or any other bodies, according to their respective heights at different distances and proportion, on the plan you have laid down.

*Lesson III. figure 3, How to raise pillars or any bodies of a certain proportion in perspective.*

Your plan being now measured out in perspective, into squares of a foot, one of these squares in this lesson serves for the base or bottom of a pillar a foot thick; the figure 3 in the plate is exactly of the same dimensions of the plan laid in perspective at figure 2.

First mark the line L K in equal proportions, by the same scale of the ground plan, figure 2, as *a b c d*, which are so many feet in height, and they standing on the base of the first figure, are upright, not in perspective; then draw a line parallel with L I, from number 4, which gives you the front of the body you are to raise; and if it is to be only three feet high, draw a line cross from C to the line rais'd from number 4, and that determines the height, which you will then find to be a foot high by measure; then from the top of the line 4 draw a line, with a black lead pencil, to the point of sight, and raise another line from 3 parallel to the line 4, till it touches the pencil'd line, passing from 4 to the point of sight, which gives you the side appearance of the column or body, as you will see it in the place where you stand [the line from the point 3 should be drawn with a pen, because it is to remain] then with a pencil draw a line from C to the point of sight, which will determine the other line, to make the shape of the top of the column; and then raise a line parallel with L I, with a pencil, from the point 2, till it touches the line from C to the point of sight.

Then draw a parallel line to C 5 at 6, 7, and you will have the square of the top of the pillar or column, as you can observe it from the place where you stand, which is suppos'd to be at A.

You must remember, that the line drawn from 2 to 6 is only an imaginary line, to be rubb'd out; for it cannot be seen from the place of standing, and therefore must not appear in the drawing; but it should not be left out, because it shews you to regulate the top of the column.

DRYADES



Fig. 2. Point of distance Point of sight.

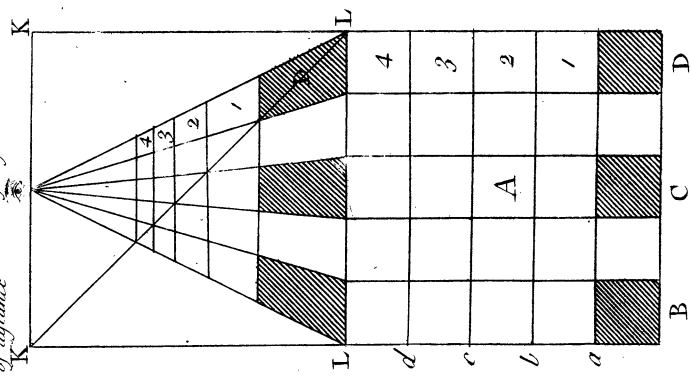


Fig. 1.

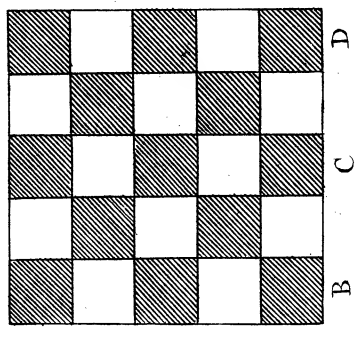


Fig. 3

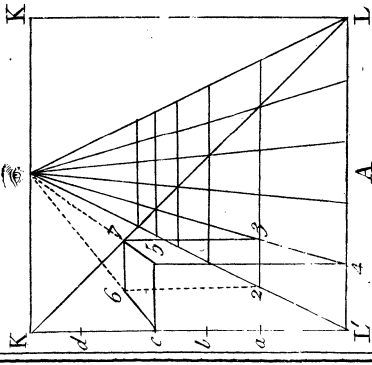
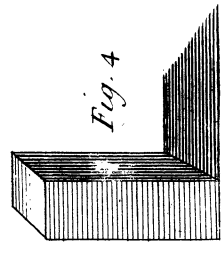


Fig. 4





## D U S

**DRYADES** [so call'd of Δρυς Gr. an oak, as having their beginning with trees and dying again with them.]

They are represented as beautiful virgins; but not so fair as the *Napeæ*; but of a brown and tawny complexion, having their hair thick like moss, and their habit of a dark green colour.

**GASPARO DUGHET**, born in 1600, liv'd at *Rome*, and excell'd in landscapes; he died in the year 1663.



**ALBERT DURER**, born in the year 1471, scholar of his father and *Michael Wolgemuth*, liv'd at *Nuremburg*, excell'd in history painting, portraits, perspective, and sculpture, died in the year 1528, aged fifty seven years. He us'd this mark, and A E in a very few plates.

*John Burchinayr Augustano* made use of the former mark; and *Matthew Grunewald* of *Aschaffenburg*, who was cotemporary with *Durer*; as also *Mark Anthony Raimondi*, in the life of *Christ*, copied from that of *Albert Durer*, for which the latter accus'd him before the senate of *Venice*.

**BRASS DUST.** This is commonly call'd *gold dust*; the best (which comes from *Germany*) is that which is the brightest and most gold like colour, which is to be perceiv'd by taking a little of it between your finger and thumb, and rubbing them together; if it be good, it will be of a bright, rich, golden lustre; if bad, will be of a dull, clayish colour.

The coarser sort works well with gold size; but not with gum-water. It is of different prices, according to the goodness; the best is worth twelve or fourteen shillings the ounce, when at the same time some other sorts are not worth above four or five shillings the ounce. The middle sort, which is worth eight or nine shillings the ounce, will work well.

**Silver DUST.** The best of this comes from beyond sea, having a lively bright lustre, like that of polish'd or new coined silver, which is to be perceiv'd by rubbing it between your finger and thumb; whereas the worser sort (which is made in *England*) is dull, dead, and heavy, more fit for a colour than a metal. The difference is easily perceived by comparing them together.

The best is worth sixteen shillings the ounce; the other counterfeited is not valuable.

**Green GOLD DUST** is an adulterated or mixt metal, casting a kind of dead, greenish colour, and is worth about six shillings the ounce.

This, as also the following, are us'd in garments, flowers, houses, and the like, making the work more beautiful and surprising.

*Sullied or dirty coloured* GOLD DUST is also a kind of adulterated metal, bearing some resemblance to drossy gold. The price is six shillings the ounce, and is us'd for the same occasions as the former.

*Tin* DUST or POWDER is made of block tin ground to powder, and is of a dull, dark, but silverish colour; it is us'd in rocks, &c. and is sold for six shillings an ounce.

*Natural copper* DUST is made of *copper* ground, without mixture to dust. This is of the true natural colour of copper, and is sold for six or seven shillings the ounce.

*Artificial copper* DUST. This exceeds the natural, and is more deep or red; but very clear, and of a bright shining colour, and shews how far art can out-do nature. It is sold for about ten shillings the ounce.

*Adulterated copper* DUST is of a thick, heavy, dull, metallic colour, and commonly us'd to work other metals on; for being laid as a ground, you may *hatch* or heighten with bright gold, or other shining metal, and is sold for about six shillings an ounce.

Sir ANTHONY VAN DYCK was born at *Antwerp*, anno 1599, and *Rubens* (his master) fearing he would become as universal as himself, to divert him from histories, used to commend his talent in painting after the life, and he kept him continually employed in business of that nature, so that he resolved at last to make it his principal study; and for his improvement, went to *Venice*, where he attained the beautiful colouring of *Titian*, *Paulo Veronese*, &c.

After a few years spent at *Rome*, *Genoa*, and *Sicily*, he returned home to *Flanders* with a manner of painting, so noble, natural, and easy, that *Titian* himself was hardly his superior, and no other master in the world equal to him in portraits.

He came over to *England* soon after *Rubens* had left it, and was entertained in the service of King *Charles I.* who conceived a marvellous esteem for his works, honoured him with knight-hood, presented him with his own picture set round with diamonds, assigned him a considerable pension, sat very often to him for his portrait, and was followed by most of the nobility and principal gentry of the kingdom.

He married one of the fairest ladies in the *English* court, daughter to the Lord *Ruthen* Earl of *Gowry*, and lived in grandeur answerable to her birth. His own garb was generally rich; his coaches and equipage magnificent; his retinue numerous and gallant, and his table very splendid, and so much frequented by people of the best quality, that his apartments rather seemed to be the court of a prince, than the lodgings of a painter. He being desirous of immortalizing his name, went to *Paris* in hopes

## E B O

hopes of being employed in the grand gallery of the *Louvre*; but not succeeding there, returned hither, and proposed to the King (by his friend Sir *Kenelm Digby*) to make cartoons for the banqueting house at *Whitehall*, the subject of which was to have been the institution of the order of the *Garter*, the procession of the Knights in their habits, with the ceremony of their installment, and St. *George's* feast. But his demands of 80000*l.* being thought unreasonable, whilst the King was treating with him for a less sum, the gout and other distempers put an end to that affair and his life, *anno* 1641, being aged forty-two years, and his body was interr'd in St. *Paul's* church.

DYING of cloth, stuff, silk, skins, bones, &c. See under the proper articles of the colours *black, white, red, blue, green.*

## E.

THE EAST is represented in painting by a pretty youth with golden locks, a splendid star over his head, in a scarlet robe interwoven with pearl; his girdle is embroidered with *Aries, Leo, and Sagittarius*, holding flowers in his right hand just ready to blossom. The sun risen, the verdant, pleasant plants, and birds warbling out their notes; in his left hand a perfuming pot.

Youth denotes that this is the infancy of time; the golden locks, the sun-beams; the star is Lucifer; the jewels, that they come from the east; the flowers, that the sun beams appearing in the east, the fields smile, and the flowers open; the perfuming pot shews, that sweet odours come from thence.

EASEL is an instrument or frame made of wood, much like a ladder, with sides flat, and full of holes, to put in two pins to set the work higher or lower at pleasure for the *ease* of the artist, whence doubtless it took its name; on the backside of it there is a stay, by which it may be set more upright or stooping.

EASEL PIECES with painters are such small pieces, either portrait or landships, as are painted on the Easel, *i. e.* the frame whereon the canvass is strain'd.

They are thus call'd to distinguish them from larger pictures drawn on walls, ceilings, &c.

EBONY, a kind of wood brought from the *Indies*, exceedingly hard and heavy, and taking a very fine polish, and on that account us'd in *Mosaic* and inlay'd work.

There are divers kinds of *Ebony*; the most usual among us are *black, red, and green*, all of them the product of the island of *Madagascar*, where they are called by the natives indifferently *hazon mainthi*, q. d. *black wood.* The

The island of *St. Maurice* belonging to the *Dutch* likewise furnishes part of the *Ebonies* us'd in *Europe*.

Authors and travellers give very different accounts of the *black Ebony* tree. The most authentick of them is *M. Flacourt*, who resided many years at *Madagascar*, as governor of it. He tells us the tree grows very high and large, its bark black, and its leaves resembling those of our myrtle, of a deep, dusky green colour.

*Tavernier* says, that the islanders bury their trees when cut down to make them the blacker.

*Pliny* and *Dioscorides* say, the best *Ebony* comes from *Ethiopia* and the worst from *India*.

*Black Ebony* is much preferr'd to that of other colours; the best is of a jet black, free of veins and rind, very massive.

It yields an agreeable perfume when laid on coals; it contains much of an unctuous quality, and thence easily takes fire, when burnt while green.

It is now much less us'd among us than it was formerly, since the discovery of so many ways of giving other hard woods a black colour.

As to *green Ebony*, besides *Madagascar* and *St. Maurice*, it grows also in the *Antilles*, and especially in the isle of *Tobago*.

The tree that yields it is very bushy; its leaves smooth, and of a fine green colour.

Beneath its bark is a white rind about two inches thick; all beneath which to the very heart, is a deep green, approaching towards a black, tho' sometimes streak'd with yellow veins.

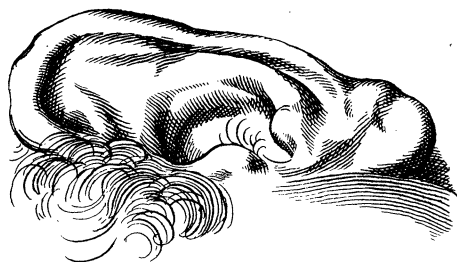
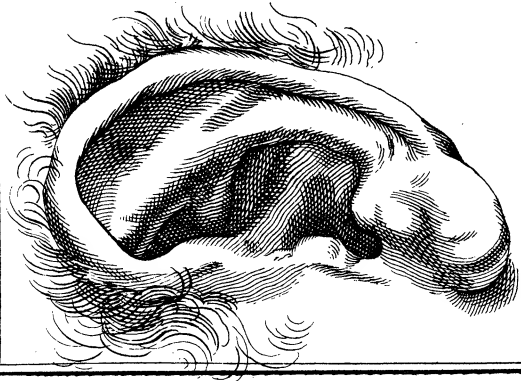
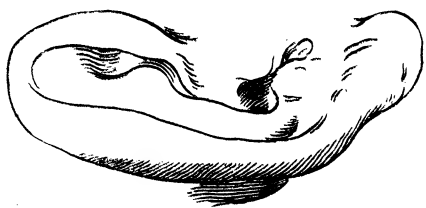
Its use is not confin'd to *Mosaic* work; but 'tis likewise useful in dying, as yielding a fine green tincture.

As to *red Ebony*, also call'd *Grenadilla*, we know little of it more than the name.

Cabinet-makers, inlayers, &c. make *pear-tree* and other woods pass for *Ebony*, by *ebonizing*, or giving it the black colour of it.

This is done by some by a few washes of a hot decoction of galls, and when dry'd, by adding writing-ink on it, and polishing it with a stiff brush and hot wax.

GERRARD EDEMA was a landscape painter born at *Amsterdam*, and disciple of *Everdine*, whose manner he at first followed. He came over into *England* in the year 1670, and became very famous for landscapes; his manner was afterwards broad and bold, in imitation of some *Italian* pictures. His pictures commonly afford a scene of cliffs, cascades, and views (as the learned *Dr. Burnet* in his theory calls it) of a broken world; he chose a country uncultivated, full of rocks and falls of water, the latter of which he never failed to express well, dispersing a  
gentle







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gentle warmth throughout the whole, to make amends for the horror of the prospect which generally represents *Norway* or *New-found-land*, places in which he studied as *Everdine* his master did before him ; after whom there are extant many prints, expressing a country wild and rude. Mr. *Edema* died in *Surrey* about the year 1700, in the 40th year of his age.

EDUCATION is represented in painting by a lady at full age, clothed in a cloth of gold ; a ray shining upon her, shews her turgid breast ; holding a rod in one hand, seeming to teach a child to read ; on her left side a pale fixed in the ground, with a tender young plant tied thereto, which she embraces with her right arm.

The ray signifies, that the grace of God is necessary, and that God gives the increase ; the breasts denote the principal parts of Education, to teach candidly, and to communicate ; the rod correction ; the tender plant, her endeavour to direct and set strait, and to teach good manners.

*To make a deep EGMARINE.* Take nine drams forty-eight grains of powder of *Crystal*, three drams twenty-four grains of *verdegrease*, and one ounce five drams and twenty-four grains of our fine salt of *tartar* ; the whole reduc'd into fine powder in a brass mortar, and then bak'd as is directed elsewhere. See *AQUA* or *AIQUE MARINE*.

ELECTION is represented in painting by an antient venerable dame in a decent habit, a gold chain with a heart that seems to have noble and lofty notions ; on her right side a flourishing oak, on her left a serpent ; pointing with her fore-finger at the tree ; she holds a label with this motto, *Virtutem Eligo*.

Old, and of a noble aspect, because experience of things seen and practised, is able to make a true choice ; the heart denotes counsel ; the tree, virtue, as being firm, deep and verdant ; the *Romans* gave a crown of it to valiant captains.

ELEGANCE of painting is not founded on the correctness of the design, as appears in *Raphael* and the *Antique*. It is most sensibly perceiv'd in works otherwise careless and inaccurate ; as in *Correggio*, where notwithstanding all the defects as to justness of design, there is an elegance even in the manner of the design itself, as well as in the turn of the attitudes, &c.

The *Elegance* of a design is a manner of Being, which embellishes and heightens objects, either as to their form or colour, or both, without destroying or perverting the truth.

*To make the FOUR ELEMENTS appear in a glass.* Take jet in fine powder an ounce and a half, oil of *tartar per deliquium* ( made without any addition of water ) two ounces, coloured of a light green with *verdegrease* ; add thereto spirit of wine, tinged with a light blue, with two ounces of *indigo* ; of  
the

the best rectified spirit of *turpentine*, ting'd of a light red, with two ounces of *madder*; mix all these in a glass, and shake them together, and you will see the heavy *black jet* fall to the bottom, and represent the earth. Next the oil of tartar made green falls, representing the water: upon that swims the *blue* spirit of wine, representing the air or sky; and uppermost of all swims the red oil of *turpentine*, representing the element of fire.

It is strange to see, how after shaking all these together they will be distinctly separated one from another.

ELEMI ( As *gum Elemi* is a pellucid resin of a whitish  
ELEMYS colour, intermixt with yellowish particles, which give it much the colour and consistence of wax.

It is call'd *gum Elemi*, but improperly, inasmuch as it takes fire readily enough, and dissolves in liquors of an oily quality, which are the characters of rosin.

It flows from incisions made in the trunk, and large branches of a kind of olive-tree, growing in *Ethiopia* and *Arabia Felix*. It is also found in the *Pouille*, a province of the kingdom of *Naples*.

*Pomet* and *Lemery* in their treatise of drugs, describe *Elemi* as a white rosin, bordering on green, odoriferous, and brought from *Ethiopia*, in cakes of two or three pounds a piece, wrapp'd up in the leaves of the *Indian* cane.

The true *gum Elemi* is that above describ'd; but there are several spurious ones, some natural, and others factitious, frequently sold for the same.

The factitious or counterfeit is made of rosin, wash'd with oil of *aspic*; tho' the ill-smell and white colour might easily discover the deceit. The natural gums vended for *Elemi* are,

1. A gum brought from the *American* islands in barrels of divers weights, cover'd up with the leaves of a plant unknown in *Europe*.

2. The next might be taken for *rosin*, but for its smell, which is something sweeter, and more aromatick.

3. Another is of an ash-colour, bordering on brown, brought over in large pieces, very dry and friable.

*Pomet* does not take any of them for natural; but rather supposes them to be originally *Elemi*, only impure and coarse, since melted down and made up by fire.

ELIZABETH, Queen of *England*, is painted with a pale countenance, light brown hair and gray eyed.



ELSHEIMER

ADAM ÆLZHEIMER, who work'd with *Peter Bruguel*, engrav'd his plates with this mark, was born in the year 1574, disciple of *Philip Uffenback*, studied at

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at *Rome*, excell'd in history, landscape, and night pieces, died in the year 1610, aged thirty-six years.

EMBOSSING is the act of forming or fashioning works  
IMBOSSING in relievo, whether they be cast or moulded, or cut with a chissel.

*Embossing* is one great part of sculpture ; being that which has to do with figures rais'd or prominent from the plain or ground. The other part which makes figures that are indented or cut in below the ground, is call'd *Engraving*.

### *Rais'd and EMBOSS'D WORK.*

1. You must first make the model of your design, and that is to be done with clay.

Take good, tough, well temper'd clay, and model it with proper tools, and work out any sort of carving or *Embossment*, as your fancy leads you ; then lay it aside to dry in the shade, for either sun or fire will crack it.

2. When it is grown perfectly dry and hard, and you purpose to cast the moulds on the models, oil your models very well with linseed oil ; and having wrought the *paste* extremely well between your hands, clap it on and press it down close every where, that it may be a perfect mould in all parts, which, when it is dry, is finish'd.

### *To make the paste for making moulds.*

Make a glue-water stronger than any *size*, yet not quite so strong as joiners melted glue ; mix with it whiting finely powdered, of as thick a consistence as paste and dough ; knead it very well, wrapping it up in a double cloth, that it may lie in it and get heat from the fire, for you must not let it grow cold ; for, if so, it will harden, and be rendred unfit for use.

### *To make the mould of any carved frame, thereby to imitate it in paste.*

Take some of the before-mentioned *paste*, according to the length and largeness of the leaves and flowers you would take off ; you need not take off a whole length, for probably there may be the same thing several times over on one side, so that one mould may serve all of that sort, they being well united or join'd together.

Work the paste between your hands, and clap it in that part of the frame you intend to take a mould off.

Let there be so much of the paste as shall suffice to make the back of the mould flat and even, and while the mould is warm, take it from the frame, and the same instant fix it to a board, which is larger than it self.

After this manner you may take off any sort of emboss'd work or carving from any part of your frame ; all which moulds may be glued on little boards, and so set by to dry and harden.

*To*

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### *To place the paste on frames.*

The frames are to be made by a joyner, which being ready, and also the paste and moulds, these last must be very well oil'd with linseed oil, striking the brush into every little crevice and corner, to prevent the moulds from sticking to the paste.

Then take a quantity of the warm paste, sufficient to fill up the moulds, and it being well work'd between your hands while it is warm and in good temper, apply it to the mould, pressing all parts of it with your thumbs and fingers; and then with a knife, cut off the superfluous paste even with the top of the mould.

Then turn out this new-fashion'd emboss'd or carv'd work on your hand, and brush it over with thin glue before it is cold, and also the place it is design'd for, and immediately put it upon your frame, in the same place where it must always remain, pressing it gently down.

Then oil your mould again, and with fresh paste make more embossments or carv'd works in like manner, which cast off and place on your frame as before, repeat this so often till your whole frame is fill'd with these embossments.

Let it stand to dry for five or six days, or a week; and then you may venture to lay your white ground on it, upon which you may *paint*, *varnish*, *gild* in oil or *burnish* as you please.

### *Another way to make rais'd or Emboss'd works.*

1. Make a strong gum-Arabick water, take whiting, fine bole, of each one ounce; grind these with a sufficient quantity of the gum water, till they are as fine and soft as butter, and so thin that if a pointed stick be dipt into it, the mixture will just drop from it; if it proves too thick, you may thin it with gum water; and if it be too thin, it may be thickened with whiting and bole.

2. Dip this pointed or taper stick into this mixture, and drop on the rock-house-tree, flower or fruit, what you would raise or *Emboss*; repeating the dropping of this mixture so often, till the work is rais'd as bold or as high as you would have it.

3. Sometimes you will find your paste to bladder or swell; this is caus'd by an insufficient grinding of the whiting and bole with gum water.

These bladders, if they are not prevented or remov'd, will cause the work when dry to be full of holes, and will spoil its beauty.

To cure this, when it is dry, take a fine rag, and with your finger rub it over and over again, till the holes and cracks are stopp'd up; and when it is dry, *rub* it well till it is very smooth.

4. In the *Japan* that is rais'd for garments, rocks, &c. some parts are elevated and higher than others; as in plaits and foldings of garments, those which seem to lie underneath, are always at the greater distance.

In *flowers* those which are first and nearest the eye are highest, and those leaves which lie first are higher than those which lie behind them.

So in *rocks*, the first and nearest must always be rais'd higher, and swell beyond that which is almost hidden or seems to lie behind.

5. *This rule holds in all things of like quality*, and therefore the design must be rais'd, according to nature to its due height, whether *figure, tree, house, flower, fruit, or landscape*; and being well dry'd with a little gumwater, vermilion, and a pencil, you must trace out the lines for the face, hands, foldings of garments, leaves of plants, seeds of flowers, fruits, houses, trees, rocks, &c. in their proper shape, according to those lines, which were drawn as boundaries, for laying the paste in its proper figures.

6. You must be provided with several instruments, as, first, a bending graver, such as is us'd by engravers; secondly, several small chissels, the broadest not exceeding a quarter of an inch; all the other proportionably less.

7. With these you must cut, carve, clear, and scrape your rais'd or Emboss'd works in height, shape and proportion to your pattern, or what is agreeable to nature and the design.

These instruments must be exquisitely sharp, and your hand very exact, easy and gentle, lest you should break off the work in any place, and spoil the piece; lastly, smooth it with a brush that has been often us'd before to make it fit for painting, *varnishing, japanning, or gilding*.

*Another way to perform these Rais'd or Emboss'd works.*

1. Strike or trace out the design, as well the inside, as the out-side of faces, necks, hands, legs, the chief strokes of the *foldings of garments, leaves of plants, flowers, seeds, fruits, houses, trees, rocks, birds, beasts, &c.*

2. Take the paste before-mentioned, but something thinner, and with it raise the lower parts of all, or any of the particulars before-named, which require the least height or raising, and let it dry thoroughly.

3. Then take the *thickest seed lack varnish*, and with a very small or fine pencil dipt in it, varnish just the edges of your rais'd work, because that as you raise the other parts of the work higher, it may hinder the fresh wet paste from incorporating with the dry, which would make the work look ill.

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4. This work of varnishing the edges must be done as often as one part is rais'd above another; and still as the work grows higher, the paste must be made thicker, and each part rais'd in order, beginning with the lowest, and ending with the highest.

5. When all is dry (if need requires) it must be smoothed with a rush, to make it fit to receive the colours and metals, or what else you are pleas'd to put upon it.

6. Mix your metalline colours with gum water, and lay them on the Embossments, and places where they ought to lie, and when they are thoroughly dry, burnish them with a burnisher, till it is bright and shines with a good lustre.

7. Having done this, go over all your Embossments with a *fine seed lack varnish*, and a proper pencil twice or thrice, and then set it off or shadow it at discretion.

8. You ought not to make any more of this paste than you can use at once, that it may not dry before you use it again; for if it be dry, you must grind it again, and then it will be as fit as before.

Nor ought it to be made too weak; and if it be, it must be strengthened with more gum water, which you may fully find out at length by many trials and experiments.

And you will find it is possible to make a paste so stiff and tough, that a violent blow with a hammer shall hardly break or bruise it.

*To set off rais'd or EMBOSS'D work with black.*

1. Having varnish'd and burnish'd your work with lamp-black, mixt with a little gum water (hardly enough to wet it, and incorporated with a brush pencil with so much fair water added to it, as with a small well pointed pencil will make it to run in fine black strokes) draw the lineaments and features of the faces, foldage of garments, veins of leaves, flowers and seeds, with the black hatchments of your flowers, bodies of trees, &c.

2. And if you would speckle any rocks, first pass them over with the said black; and when they are dry, give them two washes with the securing varnish, and then lay on the speckles.

But if the places design'd to be speckled should be too slippery, so that there is danger of their sliding off, in this case the greasy kind of slipperiness must be taken away by rubbing the places gently with a soft *tripoli* cloth.

3. This way of setting off is more in use, than that of a tracing pencil or breathing on it; not only for rais'd or *Emboss'd* work; but the flat work too: for your piece being dry, stroke it once over with the *securing varnish*; and then hatch and vein it at pleasure with a black-lead pencil, and do the same with other metals and colours besides gold.

4. For



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4. For instance; if a red flower is to be set off with *silver*, first secure the red with varnish; and when that is dry, hatch and vein it with silver, this rule is to be observ'd in all cases, where one thing is to be wrought upon another, whether *colour* upon *metal*, or *metal* upon *colour*; or metal sometimes upon metal.

5. The work being thus adorn'd and set off, if the work be flat or plain, make use of white *polishing varnish* to secure it both as to draught and ground work, which will endure a polishing.

6. But if the work be emboss'd or rais'd; then the *securing varnish* is to be us'd, because *Emboss* work will not bear a polishing, as the flat work will; but must only be secur'd and clear'd up.

But the last nam'd *varnish* may be us'd either for *flat* or *embofs'd work*, whereas the former is only fit for flat work.

7. If you work in gum water you must take care that it be not too stiff of the gum; if so, it will spoil the beauty and lustre of the metalline colours; but it may easily be weaken'd with fair water; if it be too stiff, you should only make it just stiff enough with gum, as may make them stick close to the work, and endure varnishing without coming off.

### *The way of performing rock-work.*

1. These, as has been said, are to be done last of all, because they cannot be well finish'd till the rest are compleated, except only some few scattered plants, suppos'd to grow upon them, that they may not appear naked; nor yet must there be too many of them neither, lest their number should interrupt the shadow and confound the sight.

2. If these rocks are to be cover'd with metalline colours; then lay *gold*, *silver* or *copper* with your pencil, in a full body round the outward streaks (that were trac'd with the pencil) in breadth about a quarter of an inch; but be sure that it be not too wet.

3. Then cut off the point of a large goose quill pencil, to make it flat and blunt at the end, and with that touch or dub your metal; and after that do the like to the black or brown part of the rock, that so it may be strew'd with some of the metal too, and continue it by little and little till the whole is strew'd over; but these *speckles* should be thicker towards the sides and tops, than in or near the middle.

4. Other metals, artificial and adulterate, may be laid on according to these directions.

EMERALD is a precious stone, very green and transparent and the next in hardness to the ruby.

*Pliny* reckons up twelve kinds of *Emeralds*, and denominates each

each from the Provinces or Kingdoms, where he supposed them to be found, as *Bactrian*, *Scythian*, *Egyptian*, *Persian*, &c.

But the modern jewellers distinguish them but into two kinds, viz. the *oriental* and *Peruvian*.

Tho' *Tavernier* denies, that there is or ever was any mine of *Emeralds* in the *East-Indies*, and that all that are found there are brought thither from *Peru* by the way of the *South Sea*; which was a method of commerce carried on by the inhabitants of *Peru*, before the discovery of *America* by the *Spaniards*; yet this commerce not being fully prov'd, we shall keep to the distinction of *oriental* and *Peruvian*.

The *oriental Emerald* is harder, more brilliant, and transparent than the *Peruvian*, which has generally clouds found in it, and sparkles less.

And besides, there are such quantities brought from *Peru* by the way of *Carthagera*, that the value and reputation of them is much sunk.

The *Emerald* is suppos'd to grow more and more perfect in the mine like the ruby, and to arrive at its greenness by slow degrees.

It is a common opinion that the *Emerald* grows in the *jasper*, and it is certain there are some *jaspers* so perfectly green, that they have by many been taken for *Emeralds*.

The proper matrix or marcasite of this stone is the *preme* which is reckoned among the coarser precious stones; being hard, transparent, half opaque, and usually intermixt with yellow, white, green, blue, &c.

Some authors make mention of several *Emeralds* of incredible magnitude; as a table which King *Tarik* had for his share of the plunder of *Toledo*, a table three hundred sixty-five foot long, and all of a piece, which was an emerald. And *Theophrastus* relates, that he had seen in a temple in *Egypt* one of four cubits long, and three broad; and also some mention an obelisk of *Emerald* forty foot high.

Some authors are of opinion, that *Emeralds* are taken out of iron-mines. And *Pomet* asserts that he had one to which the iron ore was still sticking.

Some tell us of *Emeralds* found in *Cyprus*, and even in *Great Britain*; but if there are of them any true ones at all, they are not considerable.

In *M. Savary's dictionary de commerce*, there is the following accurate estimate of the values of the different kinds of *Peruvian Emeralds*, as follows:

#### Rough EMERALDS.

Those of the first and coarsest sort called *Plasmes* for grinding are

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are worth twenty-seven shillings sterling the mark, or eight ounces.

The *demi-morillons* eight pounds sterling per mark.

*Good morillons*, which are only little pieces, but of fine colour, from thirteen to fifteen pound *per* mark.

*Emeralds* larger than *morillons*, and call'd of the third colour or sort, are valued at from fifty to sixty pounds *per* mark.

*Emeralds* call'd of the *second sort*, which are in larger and finer pieces than the preceding, are worth from sixty-five to seventy-five pounds *per* mark.

Lastly, those of the *first colour*, otherwise call'd *negres cartes*, are worth from a hundred and ten to a hundred and fifteen pounds *per* mark.

*Emeralds* ready cut or polish'd, and not cut, being of good stone and a fine colour, are worth :

	l.	s.
Those weighing one caract or four grains - - - - -	00	10
Those of two caracts - - - - -	1	7
Those of three caracts - - - - -	2	5
Those of four caracts - - - - -	3	10
Those of five caracts - - - - -	4	10
Those of six caracts - - - - -	7	10
Those of seven caracts - - - - -	15	00
Those of eight caracts - - - - -	19	00
Those of nine caracts - - - - -	23	00
Those of ten caracts - - - - -	33	00

## To make a paste for an oriental EMERALD.

It is shewn elsewhere under the article GLASS of LEAD. The way of tinging *crystal* and *glass of lead* of a very fair *Emerald* colour, or to make a stone that shall imitate a true natural gem, which may be us'd in rings or otherwise.

There are divers sorts of *Emeralds*, but at present they are all distinguish'd into *oriental* and *occidental*; the oriental ones are the harder of the two, and the occidental less so.

To imitate them there are several ways as follows:

Take two ounces of natural *Crystal* prepar'd as directed, and four ounces of common minium or red lead, powdered and sear'd, and forty-eight grains of *verdegrease* well pounded and of a good colour, with eight grains of *crocus martis* prepar'd with vinegar. See the article CRYSTAL.

Mix the whole well together, and put it into a good crucible that will resist the fire, leaving an inch of it empty.

Then cover the crucible with an earthen cover, lute it well, let it be dried, and then put it into the hottest place of a pot-

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ter's furnace, where they bake their earthen vessels, and let it stand as long as their pots.

When it is grown cold, break the crucible, and you will find within a matter of the colour of a very fine *Emerald*; which if set in gold, will surpass in beauty the true oriental *Emerald*.

If it happens that your matter is not enough refined and purified, you must set it in again the second time into the same furnace, where it will be purified as much as it need to be; which may be known by lifting up the cover, if the matter appears shining.

If it is not so, lute the cover on again, and put the whole into the furnace.

You may observe this once for all, that you must not break the crucible, before the matter is thoroughly bak'd and purify'd; for if you do, and so are oblig'd to put the matter into another crucible, the paste will be painted and full of blisters.

If you cannot easily have the conveniency of using a potter's furnace, you may make one your self with a little charge, wherein you may put twenty crucibles at once, each of different colours; so one baking may serve for a great deal of matter.

You must make use of hard wood to dry and heat the furnace, as is also directed in the baking of glass, and continue the fire twenty-four hours, in which time the matters ought to be bak'd and purified enough; but for more surety, you may continue the fire six hours longer, and they will be certainly bak'd enough.

The matter being thus rightly bak'd, you may have it polish'd at the wheel, and set it in a foil in gold, as is done with true gems, and you will have an emerald brighter than the oriental.

### *Another deeper EMERALD colour.*

That which makes *Emerald* deeper than the precedent, proceeds from the smaller quantity of *crystal* employ'd in it, with more of the other materials, which make it indeed more fair; but at the same time more brittle.

You must bake it at least six hours longer than the preceding, to take away that imperfection, which lead usually gives.

The dose of this paste is, one ounce of natural crystal prepared, six ounces and a half of red-lead, seventy-five grains of verdegrease, ten grains of *crocus martis* made with vinegar; the whole pulveriz'd and well mixt together. Then proceed as directed in the article preceding; only let the matter stand longer in the fire, and you will have an admirable oriental *Emerald* colour, which being set in gold with a foil of the same metal underneath, will be inexpressibly fair, *Another*

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*Another way to make a fairer paste for EMERALDS.*

This paste will be as brittle as the preceding for the reasons before given; for you must take seven ounces of *minium*, to two ounces of natural *crystal* prepar'd; to which add full eighteen grains of *verdegrease*, ten grains of *crocus martis*; the whole pulveriz'd and well mix'd.

Then proceed as directed before, and you will have an *Emerald* fit for all small works; but not so hard as the former, by reason of the great quantity of lead in it. Therefore it ought to be kept longer in the fire, that the pale colour of the lead may vanish.

*Another fairer paste for EMERALDS.*

The colour of this paste will surpass the others in beauty, if there be care taken in the operation.

Take two ounces of natural *crystal* prepar'd, six ounces of *minium* in powder, and eight grains of *verdegrease* also in powder; mix the whole well together; then put them into a large crucible, cover'd and well luted, and set it in the furnace as before directed, and do all as directed in the first article, and you will have an extraordinary fair *Emerald* colour.

*Another very fair EMERALD colour.*

This stone will be far harder and finer than the preceding.

To make it, take four ounces of natural *crystal* prepar'd, a quarter of an ounce of red-lead, and the same quantity of *verdegrease*; pulverize the whole, and sift it fine; put them together into a crucible well clos'd and luted in the furnace, as before directed, letting it stand there for thirty-six hours.

After which, if you will, you may cast your melted matter into a marble mould heated, putting it near the fire to cool gently, and you will have a very fine *Emerald*.

*Another way of making a fair EMERALD.*

Take two ounces of *crystal*, add to it forty-eight grains of *crocus martis*, and two ounces and forty-eight grains of pure salt of *tartar* prepar'd; the whole reduc'd into fine powder in a brass mortar; put these into a crucible covered with another, lute them well together; then set it into a glass-house fire, and bake it for twenty-four hours, and then in the annealing furnace for twelve hours, that the matter may cool by little and little, which then take out of the crucible, and you may cut and polish, and you will have a perfect *Emerald*.

*Another oriental EMERALD.*

Take ten ounces of the prepar'd matter call'd *Saturnus glorificatus*, (which see in letter S) and natural *crystal* half an ounce, half an ounce of prepar'd *verdegrease*, half a dram of *feretto* of *Spain* also prepar'd; reduce all into fine powder; mix them well together; put them into a crucible covered with

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another; lute it, and let it dry; then set it in a glass-house furnace for three days, and afterwards in the annealing furnace for twelve hours. Then break the crucible, and you'll find the matter ting'd of a very fine oriental *Emerald* colour, which cut and polish.

*To make glass of lead of a fair EMERALD colour.*

The easiness of tinging glass of lead of any colour is the reason of giving it an excellent *Emerald* green, especially because green is also natural to it.

Take twenty pounds of *crystal fritt* powdered and searced, and sixteen pounds of *calx of lead* also sifted; mix them well together; then put them by little and little into a pot heated in a furnace, and in eight or ten hours time it will be melted; then cast the melted matter into water, and carefully take the remaining lees from it; then put the matter after it is dry'd in the same pot again, and in seven or eight hours time it will be melted again.

Repeat this of casting the melted matter into the water, and separating the lead that sticks to the pot, as before; then this glass will be cleansed and purified from all the foulness and unctuousity the calx and powder would leave in it, and be very resplendent.

You must put it again into the pot, where it will melt and purify again in a little time.

When it is melted, put to it six ounces of scales of *copper* thrice calcin'd in powder, with twenty-four grains of *crocus martis*, made with vinegar, also in powder, and mix them together.

This powder must be cast in at six times, always mixing the glass well, and taking at each time an interval of time, as long as while you may repeat over the *creed*: let it rest for one hour, and then stir it again, and examine if the colour be to your mind; if it be, let it stand eight hours, that the whole may well incorporate.

Then stir it well, and let it rest a little, that the *fæces* may precipitate to the bottom of the pot; then it may be wrought, and the colour can scarce be distinguished from true *Emerald*.

*Another way of making a fairer EMERALD.*

For this colour, which will be far fairer than the former, you must change one ingredient in the foregoing, and instead of scales of copper thrice calcin'd, put the same dose of *caput mortuum* of *vitriolum veneris* prepar'd; then proceed exactly as before directed and you will have a very excellent green.

*To make a green EMERALD colour in glass.*

Take common glass well purified from its salt without *manganese*;

## E M E

*ganeſe*; put it into a pot in the furnace, and when it is well melted and purified, add to it (as for example) to the proportion of an ounce and half of *crocus martis*, calcin'd with vinegar to fifty pounds of glaſs. Mix well the glaſs at the ſame time to make it incorporate with the *crocus*; then let it ſtand an hour, that it may thoroughly take the colour.

This way nothing will come out yellowiſh, and it will looſe that foulneſs and blueness, which the common metal always has, and it will become green.

Then add to the ſame doſe fifty pounds of glaſs, one pound of ſcales of copper thrice calin'd, and put it in at fix divers times, mixing it well each time with the glaſs, and let it ſtand two hours to imbibe the tincture.

After the two hours are expir'd, ſtir it again, and ſee if it be as you would have it; if the colour be too blue, you muſt add to it ſome *crocus martis* prepar'd, and you will have a very fine *Emerald* colour.

*Another EMERALD green fairer than the preceding.*

The more pure the matter is, the finer the work will be that is made with it.

Take cryſtal fritt without *manganefe*, which has been twice waſh'd in water, to take out all the ſalt, and put it in a pot in the furnace; then add to it half the quantity of common white metal, alſo without *manganefe*.

Theſe two matters being well melted, mix'd and purified, put to fifty pound of metal, a pound and a quarter of powder of copper plates thrice calcin'd, prepar'd with one ounce of *crocus martis* calcin'd and reverberated with ſulphur.

After you have mix'd them well together, then put in thoſe powders at fix different times, ſtirring well the matter each time, obſerving what has been ſaid in the preceding.

You may make the colour lighter or deeper as you pleaſe, adding *crocus martis*, if it be too blue; and calcin'd powder of *Venus*, if it be not enough ſo, and ſo you will have from this a *Burnet green*.

*Another wonderful green.*

Altho' this colour is admirable, yet it is only made of common glaſs made with *pulverine*, and without *manganefe*.

This being well melted and purified, you muſt put in equal parts of powder of ſcales of *copper* thrice calcin'd, and ſcales of iron which fall from the ſmith's forge or anvil, without any other preparation than well waſhing them, to cleanſe them from aſhes and coals that mingle with them; afterwards dry them well, and pound them as fine as you can, and ſearce them. Theſe ſcales ſerve inſtead of *crocus martis*.

You



## E M E

You must observe the doses and way of proceeding, as has been before directed as to *Emerald* colours.

These scales of iron will give an admirable green; and they will drive out all the dull, natural green, which is in common glass, and make it become yellowish, or will give it a yellow green, very bright and fair.

*Another oriental EMERALD green, finer than the rest.*

Put four pounds of common fritt of *pulverine*, five pounds of common white glass pulveriz'd, five pounds of crystal fritt well wash'd; add to these three pounds of *minium*, mix them all together, and in a little time they will be pretty well purified.

Afterwards cast all that metal into water to purify it more, taking care that no part of the lead sink to the bottom of the pot wherein it is cast, for it will break it, if speedy care be not taken to take up again what is precipitated.

This glass being thus wash'd and afterwards dry'd, ought to be put into the pot again, to be melted and purified for the space of a day; then you must add to it a little of the *caput mortuum* of *vitriol of Venus*, without corrosive, (see VITRIOL) with a little *crocus martis*, stirring the metal, and proceeding, as has been shewn in the preceding process.

Then you will have an admirable oriental *Emerald* green, which may be wrought as you please.

EMERIL } a sort of metallick stone, found in most or all  
EMERY } mines of metal; but principally in those of iron, copper and gold.

There are of it three kinds; the *Spanish*, *red*, and *common Emery*.

The *Spanish* is found in the gold mines of *Peru*, and other provinces of *Spanish America*.

It is accounted a sort of *marcasite* of gold; being streak'd with little veins and specks of it.

But this sort is very rare among us, the King of *Spain* prohibiting the exportation of it.

The *red Emery* is found in copper mines, what we have of it comes from *Sweden* and *Denmark*.

The *common Emery* is found in iron mines, and is what is mostly us'd in *England*.

It is us'd by various artificers in polishing and burnishing iron and steel works, marble, cutting and scalloping glass, &c.

This *Emery* is of a brownish colour, bordering a little on the *red*, exceedingly hard, and of consequence very difficult to be reduc'd to a powder.

The *English* are said to be the only people who have got the art of pulverizing it, which is done chiefly by means of certain mills contriv'd for that purpose, and thus send it in powder to their neighbours.

## E M P

It would be in vain to pound it in mortars, it being so hard that it would pierce or break the mortar, ere it would give way.

The stone should be chose of a high colour and as rough as possible.

EMPEDOCLES is painted in violet, murrey, or purple, and so are generally the rest of the *Grecian* philosophers.

EMPERORS of *Germany* are painted in a violet coloured robe, watchet or light coloured.

EMPERORS of *Rome* are painted with yellow carrusters embroidered with silver; the labels of their sleeves and short bases, of watchet; their under sleeves and long stockings white; a laurel wreath with a silver jewel before, and rays of gold issuing from the wreath.

ENAMEL, vulgarly call'd *Amel* is a kind of coloured glass, us'd in painting in *Enamel*.

The basis of *Enamel* is the finest crystal glass, made of the best *kali* from *Alicant*, and sand vitrified together.

To this glass are added tin and lead in equal quantities calcin'd by a reverberatory fire.

To this fundamental composition of *Enamel*, are added other metallick or mineral matters, to give it the various colours requir'd, as *crocus martis* for yellow, *æs uftum* for green.

*Enamel* may be distinguish'd into three kinds.

The *first* intended for the counterfeiting and imitating precious stones.

The *second* is for painting in *Enamel*.

The *third* is us'd by the *enamellers*, jewellers, and goldsmiths on gold, silver and other metals.

The *Enamel* us'd in imitating precious stones, and also that for painting, is usually prepar'd by the workmen themselves, who are employ'd in those arts. The rest comes to us either from *Venice* or *Holland*; and particularly the white is that by which the makers of the *Dutch* ware give the lustre and polish to their works.

The composition is the same in the main in all the three kinds; the difference consists only in giving it the colour and transparency.

### ENAMELS for painting.

The *white Enamel* us'd by painters in *Enamel*, is the same with the common *Enamel* us'd by *enamellers*; except that it is to be prepar'd by grinding and cleansing it with *aqua fortis*.

Then it is wash'd in fair water, pounded or ground over again in a mortar made of flint or agate.

The *black* is made of *perigueux* well calcin'd, and ground with oil of *Aspic*; having an equal quantity of the *enamellers*, or goldsmith's black added to it. The

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The *ruddy-brown* is made with *fæces* of vitriol and salt petre, or with the rust of iron, well ground on an agate with oil of *Aspic*.

The *yellow Enamel* is the same with the goldsmith's *Enamel*, the composition of which you will see hereafter.

*Vermilion red* is made with vitriol calcin'd between two crucibles luted together; afterwards first wash'd in *aqua fortis*, and then in fair water, the fire must be moderate for about half an hour.

*Lake red* is compos'd of fine gold dissolv'd in *aqua regia*, with *sal armoniac* or common salt; when the dissolution has been compleated, it is to be put into a cucurbit with spring water and Mercury in a sand heat for twenty four hours. Then the powder which remains at the bottom of the cucurbit, after the water has been pour'd off, is to be ground up with double its weight of flower of sulphur, put into a crucible and set over a gentle fire. And after the sulphur which takes fire is exhal'd, the red powder which remains is to be ground up with *rocaille*.

*Blue* is made of the *azure* or *lapis*, us'd by oil-painters well purified and prepar'd with brandy, and set for five or six days in a bottle expos'd to the sun's rays.

An *amber colour* is made by white copperas calcin'd. These seven or eight colours or *Enamels*, serve for compounding all the rest; as *blue* and *yellow* make *green*, and so of other colours.

*Jewellers, Goldsmiths and Enamellers Enamels.*

These are brought to us chiefly from *Venice* or *Holland* in little thin cakes of different sizes; commonly about four inches diameter, having the mark of the maker struck on it with a puncheon.

The marks which are the most usual, are the sun, a fyren, a monkey, or the name of *Jesus*, &c.

Those which come from *Venice*, are chiefly white, carnation, yellow, slate colour, sky-blue, green, and a deep blue call'd a false *lapis*.

These seven colours are the principals of all the others; which arise out of the mixture of these, and the white in particular, is as it were the ground of all the other six principal colours.

The *white*, as has been said, is made of crystal glass, and lead calcin'd by a reverberatory fire. This becomes a sky blue by adding copper and *cyprus vitriol*, a green by adding filings of copper, &c. a yellow by adding the rust of iron; a flesh colour by adding *perigueux*; and a slate colour by adding azures.

ENAMELLING is a method of painting with *Enamels* or metal colours, ground, reduc'd to powder, and us'd with a pencil like other colours; then fus'd, bak'd again, and vitrified by force of fire.

This

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This art is very ancient, and seems to have been first practised on earthen or potter's ware

History makes mention of beautiful vases, enamelled with various figures made as early as in the age of *Porfenna* King of *Tuscany*.

It is true, these came far short in beauty to those afterward made at *Faenza*, and *Castle Durante* in the *Dutchy of Urbino*, in the time of *Raphael* and *Michael Angelo*.

Some of these vases are still to be seen in the cabinets of the curious; the design or drawing of the figures of all which are much superior to the colouring; they of those times being unacquainted with the art of making any more than two colours, viz. black and white, either for earthen or metal works; excepting a faint kind of carnation in the faces and other fleshy parts.

The art was retriev'd in *France* in the time of *Francis I*, and particularly at *Limoges*; where many valuable pieces were wrought, after the manner of the ancients, i. e. perform'd well as to the drawing, and *clair-obscur*, chiefly in two colours.

There are two ways of painting in *Enamel*; the one with clear and transparent, and the other with thick and opake, colours.

To make the first fit for use, they are only to be ground up with water, and for the second with oil of *Aspic*.

The first are laid on the metal flat, and bordered or edg'd with a run of the metal, to keep the colours asunder, though there are some pieces, the colours of which have been laid on contiguous, and without any partition; which is very difficult to do, by reason the transparent colours in melting are apt to run the one into the other; especially in the little works.

The invention of opake colours is of a much later date, and by much preferable to that of transparent ones.

But all metals will not equally admit both kinds; as for instance, copper will not bear all the transparent colours, which bears all the opake ones; but in laying the transparent ones, they are forc'd first to cover it with a lay or couch of *black Enamel*, and upon that lay leaf of silver, and apply upon this other suitable colours, i. e. the colours and *Enamels* proper for silver, which itself does not allow of all kinds.

Those which suit best with it are purple, green, azure, and aqua marine. But gold receives all kinds and colours perfectly well, both opake and transparent.

But then the gold us'd must be the very finest. For if the transparent colours are laid on a base gold, they will grow dim and livid; there being a kind of smoke that settles on it not unlike black-lead,

Of transparent *Enamels* the hardest are the best; although there is a difference even among these, some retaining their colour in the fire, and others losing it.

As for the *reds*, they are only red by accident; they being only yellow when made and apply'd on the gold, and becoming red in the furnace.

The best transparent reds, are those made of calcin'd copper, iron rust, orpiment, and calcin'd gold, melted with the due proportion of glass.

But all our fine modern pieces of *Enamel* are owing to the method of painting with opaque or thick *Enamel*; particularly those curious ones on gold, representing portraits to as great perfection, as the best painting in oil, and even some history pieces; with this great advantage, that their lustre never decays.

The *French* claim the invention of this art; nothing of the kind having been attempted before the year 1630, when *Jean Toutin*, a goldsmith of *Chasteaudun*, and a great master in the common way of painting in transparent *Enamel*, first apply'd himself to the finding out a way to use thick colours of different tints, which should melt with fire; but yet retain their lustre, purity, &c.

*Toutin* succeeding in his attempt, and having got the secret communicated it to his fellow *artists*, who also in their turns contributed to the bringing it to a higher perfection.

The first that distinguish'd himself was one *Dubie*, who wrought in the galleries of the *Louvre*; to him succeeded *Mortiere*, a native of *Orleans*, who apply'd himself chiefly to the painting of rings and watch cases.

But *Robert Vauquer* of *Blois*, scholar to *Mortiere*, exceeded all that had been before him both in design and colours.

And *Pierre Chartier* of *Blois*, betook himself to the painting of flowers, wherein he succeeded to admiration.

By this time the *English* were fallen into the way, and were the first who apply'd it with success to the painting of portraits, which was now grown mightily in vogue in the place of those in miniature; M. *Felibien* observes, that the first and most finish'd portraits, and those in the finest colours were brought into *France* by *Petitot* and *Bordier* from *England*; this put *Louis Hance* and *Louis Guernier*, two good painters in miniature, to attempt the like, in which the latter succeeded beyond every body.

He was also the inventor of several new tints for *carnations*, and had he liv'd much longer had probably merited the glory of carrying the art to its last perfection.

This kind of painting to be in perfection must be done on plates of gold; for silver turns the whites yellow and copper, besides that it emits a fume, which tarnishes the colours, is apt to scale and crackle. These

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These plates must be made a little hollow on one side, and rais'd on the other, either in a circular or oval form, to prevent the gold's fretting by the fire, and making the colours crack and fly; nor must they be made too thick.

It is enough if they can bear the colours; though it is usual to strengthen them all around with a circle something thicker. The plate having been hammer'd very evenly throughout, a white *Enamel* is laid on both sides, although but one of them is to be painted. The design of this is to prevent any swelling and warping by the fire, for otherwise in large pieces, and especially if the colours be laid on any thing unequally, they are apt to rise up in puffs and blisters.

Now this first lay which is white, remaining smooth and uniform, serves as a ground for all the other colours.

The gold plate being thus enamelled with white; the draught or design to be painted must be chalk'd hereon, and afterwards the whole accurately drawn out in a ruddy brown.

The draught or out-line being thus finish'd, the piece is set to the fire, and then painted with the colours.

The white ground painted on serves all the colours for white, it being the usual method to spare the ground from first to last, in the places where the lights are to be, after the same manner as in miniature; though they have another white to lay over the other colours, when there is occasion to raise them.

As painters in oil retouch their paintings several times, and let them dry, so in this sort of painting they touch the piece as often as they please, setting it each time to a reverberatory fire, and taking it away again as soon as they perceive the *Enamel* has got its full polish.

The reverberatory fire is made in a little furnace, wherein there is fire both at top and all around; only a void place in the middle, where the piece is to be put for the *Enamels* to melt. See the plate.

The colours are laid on with the tip or point of the pencil, as in miniature; with this only difference, that they use oil of *Aspic* to dilute them instead of gum water. See MINIATURE.

*The method of ENAMELLING by the LAMP.*

The lamp is made either of *copper* or *tin* and consists of two parts, the box and the lamp.

In the lamp which is a kind of a flat oval, is put the oil (call'd *cabbaline oil*, i. e. horses grease) and out of this rises the wick.

All the use of the box is to receive the oil, which the ebullition occasion'd by the intense heat, might throw abroad.

This lamp is plac'd on a table of a proper height, &c. under which about the middle of its height is a double bellows like the bellows of an organ, which the workman raises and falls with his

his foot, to increase and quicken the flame of the lamps, which is by such means rais'd to a degree of vivacity almost incredible.

If there be several lamps plac'd upon the same table, the wind of the bellows is convey'd to the several lamps, though there be never so many by means of grooves cut along the thickness of the table, and cover'd with parchment, extending from the bellows to a tube or pipe plac'd before each lamp; these tubes are of glass, and that the *enamellers* may not be incommoded by the heat of the lamp, each tube is covered at about six inches distance, with a piece of tin call'd a *fan*, fix'd in a hole of the table.

In works which don't take up much time, they only use a glass blow-pipe, to heighten the flame of the lamp.

When the *enameller* goes to work, he heats himself before the lamp, with his foot on the treddle; and holding in his left hand the piece of work he has to *Enamel*, or the brass and iron wires his figures are to be form'd with; with his right hand he draws out the thread from the *Enamel*, held to the lamp; and this with a surprizing dexterity.

So that by applying the cake of *Enamel* to the flame of the lamp, he draws it out into threads inconceivably fine.

Those that are made use of in artificial plumes of feathers, are so very slender, that they may be wound on a reel like thread or silk.

The factitious jeats of divers colours, sometimes us'd in embroideries are also made of *Enamel*, and that with so much art, that each piece has its hole to pass the silk through, with which it is sew'd. These holes are made by blowing them in long pieces, which are afterwards cut off with a proper tool.

The *Dutch* or *Venetian Enamels* are seldom us'd pure; the common way is to melt them in an iron ladle with an equal quantity of glass or crystal.

And when the two matters are in perfect fusion, they draw it out into threads of different sizes, as occasion requires, by taking a quantity between two pipe stopples, held in the two hands and removing them asunder, as far as the arms will reach.

If the thread be longer than the workman can stretch, a second person takes one of the ends, and draws it out while the other holds the *Enamel* to the flame.

All the threads drawn after this manner are round, so that if the nature of the work requires them to be flat, they are afterwards drawn through a pair of pinchers while yet hot.

They have also another sort of instrument in manner of plyers, to draw out the *Enamel* by the lamp, when it is to be work'd or dispos'd in figures or otherwise.

Lastly,



Lastly, they have glass tubes of various sizes, for blowing the *Enamel* into various figures, and preserve the necessary vacancies therein, as also the spare stuff, and form the contours.

There is nothing but what may be thus represented by *Enamel*; and there are figures so finely finish'd of this kind, that one would take them to have come out of the hands of the ablest sculptor.

**BLACK ENAMEL.** *The mixture or matter for Enamels in general.* Take leaden bullets thirty pounds, tin in bits thirty three pound; mix them and calcine them, as is directed in the article **CALCINATION** (which see) scarce the calx, put it into a glaz'd earthen pot full of water; set it over a fire, let it boil a little; take it off the fire, decant off the water gently into another vessel, which carries along with it the finest flower of the *calx*, repeat this till no more flower will rise; then calcine the remaining calx, as you did before.

Put these waters into one large body or vessel, and evaporate to a dryness, over a very gentle fire.

*The mixture for Enamels.* Take of this calx twenty five pounds, of fritt of white *tarso* searced twenty five pounds, fine salt of tartar four ounces; mix all well together in a pot, and let it stand in a glass-house fire furnace, for ten hours to meliorate and purify; then take it out and reduce it to an impalpable powder, which keep close in a dry glass for use.

I. *Thus is the matter prepar'd to receive colours for Enamel.* Take of this mixture six pounds, *zaffer* prepar'd three ounces, *manganese* prepar'd three ounces, reduc'd to a very fine powder, put them into a glaz'd earthen pot in the furnace for some hours; let the pot be very large, because the metal will swell much; when it is purified, cast it into cold water, and dry it, put it into the pot again to melt and purify; then if the colour is good, keep it for use, if not you must put in more or less of the colouring matter, till it is perfect, and then make it into cakes.

II. *Another black Enamel.* Take of the above mention'd mixture six pounds, *zaffer* prepar'd, *crocus Martis* made with vinegar, *feretto*, of each two ounces, all being reduc'd into a fine powder; mix them well together, put them into a glaz'd earthen pot in a furnace to melt and purify; when it is well digested, cast it into water; then dry it, and put it into the pot again; let it melt and refine, then take it out and make it up into cakes.

III. *Another velvet black Enamel, finer and fairer than the former.* Take of the said mixture six pounds, red-tartar six pounds, *manganese* prepar'd three ounces, reduce all to a very fine powder; mix them and put them into a very large well glaz'd earthen pot, because the mass will swell; melt and purify,

cast it into water, dry it and put it into the pot again, melting and purifying as before; make it up into cakes, and keep it for use.

*A black for painting on Enamel.*

1. The former black *Enamel*, levigated with oil of spike, makes an excellent colour.

2. Take black *Enamel* of either sort, peregrine well calcin'd of each four ounces, mix and make an impalpable powder; then add oil of spike, and it will agree excellently with the *Enamel*.

I. **BLUE ENAMELS** or *turcoise*. Take of the mixture for *Enamels* six pounds, *zaffer* prepar'd three ounces, copper twice calcin'd one ounce twelve grains, reduce all to a fine powder; put it into a white glaz'd earthen pot, when the metal is well melted, cast it into water, dry it, and put it into the pot again, and let it stand till it is well melted, purified and incorporated; then take it off and make it up into cakes.

II. *Another noble blue*. Take of the mixture six pounds, plates of copper calcin'd three ounces, *zaffer* prepar'd one ounce twelve grains, these being reduc'd to a fine powder, mix and melt them as before, casting it into water; dry it, and return it into the pot again to melt, purify and incorporate, then take it off and make it into cakes.

III. *These glorious blues* are admir'd by most people, as being the most agreeable to the sight of all others; their beauty and splendour being so great and transcendent above all other colours, they only having the resemblance of heaven itself; for which reason the *Romanists* esteem it a sacred colour.

IV. *A blue turcoise Enamel*. Take of the mixture six pounds, put it into a white glaz'd earthen pot, melt and purify it, cast it into the water, and dry it, put it into the pot again, melt it and add to it at times the following mixture.

Take scales of copper thrice calcin'd three ounces, *zaffer* prepar'd four scruples and six grains, *manganese* prepar'd eighteen grains, all reduc'd to a fine powder; mix them and stir the mass very well each time with your iron hook, that the powders may incorporate; being well coloured, take it out and make it into cakes.

But you must observe, that the colour is right good and perfect, before you empty your pot; for experience must teach you how to proportion the tinging ingredients, as to more or less; if there be too much of the tinging matter add more of the mixture, if too faint, add more of the tincture or tinging matter or powder, till the colour is as you would have it.

As this colour is very fine, so it is very difficult to make well, and requires many trials and much experience; therefore you must

must not be discourag'd, if you fail in your first essays; for by continuing to make farther trials, you will at length effect what you desire; and be able to judge and know, when you are in the right, and when in the wrong.

*A blue for painting on Enamel.* Take any of the foregoing *Enamels*, purify them with *aqua fortis*, and grind them with oil of spike as for other colours; these are some of the noblest that can be us'd for this work.

2. Take painter's *Enamel* prepar'd, put it into a glass bottle, add to it *aqua vitæ*, so as to cover it four inches, four times a day, so will the grosser parts fall to the bottom; decant the clear liquor, evaporate the spirit, and dry your *azure*, and it will be very fine; then grind it on a marble, and it will be fit for this work, and far beyond *ultramarine*; which yet may be made use of as occasion requires.

*Proper rules and matter for all sorts of Enamel, with directions for qualifying the fire, in order to succeed well.*

This most agreeable way of enriching gold by *Enamel*, which proceeds from the beautiful variety of colours which may be apply'd, being an art no less painful than necessary for ornament, we proceed to lay down such methods in this book, as shall equally answer the benefits of the publick, and satisfaction of the more curious.

We propose in the first place, to give direction for the choice of matter to be us'd, and thence shew the preparations for all sorts, and how to make and suit the colours most convenient on *Enamel*.

The method not only used by the goldsmiths, but by such as form portraitures with it of all sorts, as *men, beasts, fowl*, and other curiosities, very naturally, by a just disposure of the colours, is most admirable; to effect which no more is requir'd than a lighted taper, and a hollow pipe of metal for that purpose, to blow the blaze to the *matter*, and make it malleable and soft, and thence the several figures are drawn or impress'd thereon.

And this may be so far improv'd and heightned, as to admit of performances rather to be thought the essay of a divine than human artist. Witness that notable *piece* of a *chariot* drawn by *two oxen*, of which *Cardan* takes notice in the fifty second chapter of his *tenth book*, which was so compleatly done in *miniature*, that the whole might be cover'd with the wing of a fly. The *ship* rigg'd, and man arm'd, which *Hawel* says he saw. Those little statues of *men*, with several other curiosities of figure *Vornicus* also assures us of. Not to omit the church of *St. Mark* at *Venice*, where the *Mosaick-work* is plentifully interlaced with hi-

story of all sorts, distinguishable by the variety of colours, and gildings, and all consisting of several different subjects. In short, what account *Agricola* has left us of these matters, in his twelfth book, give us no less cause to admire this art than he had, when he saw such notable pieces of which he makes mention, and which he assures us was deservedly very great. The use of *Enamel* is very ancient, however that of working on metal is more modern; and for the great perfection to which it is arriv'd, we are oblig'd to this present age.

*To prepare the matter for Enamel.* Take lead in piggs thirty pounds, *plate-tin* of *Cornwal* thirty three pounds; mix and calcine them as directed for lead, precisely observing the directions there laid down. This done searce the *calx*, and put it all into a glaz'd earthen pot, fill'd with water, put it over a fire, and let it boil a little; then take it off, and pour the water gently into another vessel, which will carry along with it the more *subtile calx*. Repeat this until no more of the *calx* can be subtiliz'd; which you may discover by the pureness of the water in pouring it out of one vessel into the other. After this calcine the remains of what is in the first pot, as before, and thus continue to calcine and subtilize till you can get no more of the *subtile calx*. Lastly, put the waters out of all the receivers into larger, and set it on a slow fire to evaporate. The fire must be very gentle for this reason, that the *calx* do not founder or fall to the bottom, but continue more fine and subtile, than when it was first calcin'd.

Your *calx* being thus prepar'd, take thereof about twenty five pound, and as much *fritt* of white *tarso* beaten and searced, to these add four ounces of salt of *tartar*, finely searced and prepar'd; mix all these powders very well together in a pot, and let it stand in the glass-house furnace or oven about ten hours to digest and purify; then take them out, and reducing them to an impalpable powder, keep it in a close dry place for use. Thus must your matter for *Enamel* be prepar'd to receive the colours, but of that more hereafter.

*To make Enamel of a milk-white colour.*

This colour of all others is the purest; 'tis used for the ornaments of virginity, the emblem of innocence, as also the symbol of candour and chastity. To perform this, do thus: take six pound of the prepar'd powder, and twenty four grains of *manganese* of *Piedmont*, prepar'd; mix them well together, and put them into one of your furnace pots to melt and purify over a very swift fire, which will be done in a little time. The matter being thus melted, take it out of the pot, and throw it into very fair water, and being afterwards dryed, put it again into the pot to melt; do thus with it thrice, changing the wa-  
ter,

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ter. When you have thus purified it, if you find it justly white, 'tis good ; but if it be greenish, add a little more *manganese*, and 'twill become white as milk, and fit *Enamel* for gold, or other metal. Take it off the fire, and make it up into cakes, and keep them for use.

### *A turcoise-blue Enamel.*

This colour of the *turcoise* or *Turkey-stone*, is very fine for *Enamel*, but withal very difficult to make well, and requires a great deal of experience. But now for the *Enamel*, which to make of this *turcoise* colour, you must put of the *prepar'd powder* six pound, into a white glaz'd pot to melt and purify it ; then cast it into water, and when dry put it again into the pot, and being melted over again, add to it, at four times, this composition, *viz.* *scales* of copper thrice calcin'd, three ounces, of *prepar'd zaffer* eighty six grains, of *manganese* prepar'd, forty eight grains ; mix all these and reduce them to a very fine powder, stir the matter very well each time with your iron-hook, that the powders may incorporate, and for reasons given elsewhere.

Thus when your matter is fully and well tinged, take the approbation of a goldsmith on some of it, as to the colour, that you may have the more assurance before you proceed to empty your pot. Your own experience must shew you how to proportion the ingredients for tinging the matter more or less. If you perceive that the tinging-powders are too predominant, add the more principal prepar'd powder, if it be too faint, add the greater quantity of the tinging-powders ; and thus do to improve or lessen the colour until it be to your satisfaction.

### *To make a very fine blue Enamel.*

You may make *Enamel* of this colour with four pound of the *principal* prepar'd powder, two ounces of prepar'd *zaffer*, forty eight grains of copper thrice calcin'd, these reduc'd to a mixt impalpable powder, must be put into a white glaz'd pot ; when the metal is well melted, cast it into water, and when 'tis dry put it into the pot again ; after that, let it stand upon the fire until it be well digested and incorporated ; then take it off, and you have a very fine *Enamel* for goldsmiths, which make into cakes, and keep for your use.

### *Another blue Enamel.*

This *Enamel* is altogether as gay as the former, only the colour is not the same, for which reason 'tis prescrib'd here.

To make which, take four pounds of the principal prepar'd powder, two ounces of plates of copper calcin'd, forty eight grains of prepar'd *zaffer*, mix and reduce them to an impalpable powder, put this into your white glaz'd pot, and having melted the metals until they incorporate, cast it into water, whence being dry, return it to your pot, and let it remain there until it purify ;

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when the colour is well mixt to your satisfaction, take it off, and cake it as before.

### *To make a pretty green Enamel.*

It may be very perfectly imitated, if you put four pounds of the *principal powder* into your white glaz'd pot, and let it melt and purify ten or twelve hours in the furnace, afterwards cast it into water, dry it and put it into the pot again, and let it be fully refin'd; then take scales of copper thrice calcin'd two ounces, scales of iron at the smith's forge on the anvil-block, forty eight grains; mix and reduce them to an impalpable powder, and throw it at three several times and portions into your pot of principal matter, stirring the metal very well, that it may be equally tinged by the mixture of the colours; if it be to your fancy, and of a pleasant colour, let it stand a while on the fire, until it be thoroughly incorporated; thus take it off, and you'll have a delicate green *Enamel* very proper for all sorts of goldsmith's work.

### *Another green Enamel.*

The colour of this following is something different from the former, but no less excellent: Take six pounds of principal powder, two ounces of *feretto* of Spain prepar'd, forty eight grains of *crocus Martis*, prepar'd with vinegar, make these into an impalpable powder, and mix them well, and put these into your white glaz'd pot; let it remain in the furnace to melt and refine the matter; afterwards cast it into water, and again into your pot, having refin'd it before, until it refine very well; when 'tis melted, observe whether the colour be satisfactory, and let it stand some hours longer to refine, and when 'tis taken off, you'll have a very fine green *Enamel* for goldsmiths.

If the colour be too faint, add more tinging powder proportionably enough to perfect it.

### *Another.*

There is another way to make green *Enamel* after this manner; put into a white glaz'd earthen pot four pounds of *principal powder*, and let it refine in the furnace a little while, cast the metal afterwards into water, and (being dry'd) again into the pot; then add at three equal portions, this powder compounded of scales of copper thrice calcin'd, two ounces, and of *crocus Martis* prepar'd with vinegar, forty eight grains, these well mixt and powder'd together, stirring the metal with the iron-hook to incorporate it, let it remain on the fire until it be well refin'd, and when 'tis well and perfectly colour'd to satisfaction, take it off and keep it for use.

### *To make black Enamel.*

'Tis most necessary in this art, and can least of all be spar'd, because it has a peculiar beauty which sets it off among the more splendid



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splendid and sparkling pieces; you may make a very good velvet-colour with four pound of the *principal powder*, two ounces of prepar'd *zaffer*, and two ounces of *manganese* of *Piedmont*, prepar'd as before directed; mix and pulverize them very well together, and put them into a glaz'd earthen pot in the furnace for some hours; the pot must be more than ordinary large, because the metal will rise very much; when 'tis purified, cast it into water, dry it, and then return it into the pot to be refined over again, which will be in a little time; then see if the colour be to your fancy, and according as you find it, put in more or less of the former ingredients, and having thus perfected it, take it off and cake it; this *Enamel* will be a good velvet-black for goldsmiths.

### *Another black Enamel.*

This second sort is distinct from the other by the difference of the quantities and tinging ingredients.

Take six pounds of *principal powder*, two ounces of *zaffer* prepar'd, two ounces of *crocus Martis*, prepar'd with vinegar, two ounces of *feretto* of *Spain*, pound and mix them very well together, making an impalpable powder, and put it into your glaz'd pot in the furnace to melt and purify; when it is well digested, cast it into water, and dry it, and put it again into the pot, where let it remain a while to refine; when 'tis for your purpose, take it off and cake it as usual; and you'll have a very good and most convenient *Enamel* for the goldsmiths to set in colours, and enamel with.

### *Another black Enamel.*

Here is a third way of making the velvet-black *Enamel*, much better and of a finer gloss than the former.

To make which, take four pounds of *principal powder*, four ounces of *red-tartar*, two ounces of *manganese* of *Piedmont* prepar'd, reduce these to a very fine powder, and put into a glaz'd pot bigger than ordinary, because of the rising of metal; let it melt and digest in the furnace, and cast it into water, (and when 'tis dry, put it into the pot again, there to remain until it melt and refine anew; when you find the colour proper for your use, make it into cakes, and keep it for the goldsmiths use.

### *To make purple-colour'd Enamel.*

Take four pounds of *principal powder*, add to this two ounces of *manganese* of *Piedmont*, prepar'd as for red *Enamel*, put these into a white glaz'd earthen pot, allowing it room enough to bear with the ebullitions and rising of the metal; when 'tis thoroughly melted, cast it into water, dry it, and put it again into the pot to refine; then consider whether it be well enough colour'd, and accordingly make it up into cakes, and keep it for use as before.



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### *Another purple Enamel.*

This is no less delicate than the former, for all manner of goldsmiths work.

Take six pounds of the *principal powder*, three ounces of *manganese* of *Piedmont* prepar'd, six ounces of scales of copper thrice calcin'd, as before prescrib'd, reduce these to an impalpable powder, and let them dissolve and refine in the white glaz'd pot in your furnace; afterwards cast the metal into water, dry it well, and return it into the pot to refine over again; examine the colour, if it be right, take it off and cake it up for use as before.

### *To make Enamel of violet-colour.*

Take six pounds of *principal powder*, two ounces of *manganese* of *Piedmont* prepar'd, and forty-eight grains of thrice calcin'd scales of copper, make all into a very fine powder, and being well mixt, put them together into your white glaz'd earthen pot in the furnace, let it melt and digest; then cast it into water, and dry it, put it into the pot again, and let it refine very well; try its colour, and if 'tis agreeable, take it out and cake it, and you'll have a very fine violet-colour'd Enamel, proper for all manner of goldsmiths work of that sort.

### *To make yellow Enamel.*

Take six pounds of *principal powder*, three ounces of *tartar*, seventy two grains of prepar'd *manganese*, reduce all into an impalpable powder, mix it well, and put it into a glaz'd earthen pot, large enough to dispense with the ebullition and rising up of the metal; let it stand in your glass-house furnace to melt and incorporate, afterwards cast it into water, then dry it, and leave it in the pot again to refine very well; then try the colour, and if it be sufficient, make it into cakes as before, and you'll have a very taking yellow *Enamel* for all sorts of metal except gold, which by its resemblance would only dull and spoil the beauty, unless it were placed among other colours, as the goldsmiths already are very well acquainted withal.

### *To make a crystal-ground for red Enamel.*

The red requires a *crystal* more lasting than any of the former, therefore the following is a composition fit for that purpose.

Take twenty four pounds of salt of *polverine*, *rochetta*, or *soda*, prepar'd, and six pounds of fritt, these mixt and finely powder'd, must be steep'd in water to bring the mass into a body like paste, and then make it up into small thin cakes; lay them on tiles in a lime-kiln, or potter's-furnace for six hours to calcine, or near the glass-house furnace vault, or on the upper vault, taking special care that they don't melt, let them remain there for three or four days, or until they be very well calcin'd.

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This done resolve them into and impalpable powder, adding thereto four pounds of calx of lead and tin prepar'd and calcin'd according to directions, four pounds of white calcin'd *tartar*; these being mixt and very finely pulverized, put them into your glaz'd pot at the glafs-house furnace to melt and refine, thence throw the metal into water, and again (when dry) into the pot to melt; cast it a second time into the water, and dry it, let it melt and refine over again in the pot for some hours, and 'twill be fit for use.

Consider always the lead which is among the other ingredients, and be very careful that you let none of it remain in the pot when you throw the matter out into the water, for it will be apt to precipitate to the bottom, and this for several reasons elsewhere given.

*An excellent preparation of fusible manganese to be used in making red Enamel.*

We have given sufficient direction elsewhere, to prepare *manganese* of *Piedmont*, for tinging these matters, of which we have already discours'd, but for red and rose colour *Enamel*, there are some more exquisite ingredients and preparations required, which we shall give an account of here before we speak of the *Enamel* itself.

Any other than *manganese* of *Piedmont* will not serve the purpose, for that only is fit for the use to contribute to the fairness and life of the colour; take therefore equal quantities of this *manganese* and *salt-petre*, as much as you please, and let them reverberate and calcine in an earthen pot in your furnace twenty four hours; then take it out and wash it well in warm water to separate the *salt-petre*, dry it well, and the mass will be of a red colour: To this add an equal quantity of *sal-armoniac*, grind these on a marble with distill'd vinegar, as painters do their colours; dry it, and reduce it to powder, putting it afterwards into a strong matras or bolt-head of glafs, big-belly'd and long-neck'd, there to sublimate about twelve hours; break your matras, mix all the volatile and fixed parts together, adding the same quantity of *sal-armoniac*, as there are flowers, and take care to weigh them before composition; grind, pulverize, and sublime as before, repeating this until your *manganese* remain fusible in the bottom of the matras; and this is that which you must preserve to tinge crystal with, and make it ruddy and diaphanous, or transparent as a ruby.

*The way to make a fixt sulphur, to be used in compositions for Enamel.*

This fixt sulphur serves for several uses in chymistry, and very convenient for obliging young artists,

Now

Now, though it be not so unavoidably necessary for making *red Enamel*, yet we will not omit it here, because it contributes to our prescribing two sorts of ways for it, as well as to satisfy the more curious goldsmiths.

Put flowers of sulphur, as much as you please, into a glass cucurbit luted at bottom, pouring thereto oyl-olive as much as will drown the matter by two inches; set the cucurbit on a violent sand-furnace for a full hour; then take it off, and pour in strong vinegar, and the sulphur will soon precipitate, and the oil ascend on the surface of the vinegar; decant this from the sulphur into another vessel, and put in more fresh oil as before, do thus thrice, and you'll have at length a fixt sulphur to make use of for *Enamel*.

*Another fixt incombustible sulphur.*

There is yet another way for fixation of sulphur for the same use, and several chymical operations, wherein it has very great virtue.

Make strong lye of quick lime and harsh oak ashes; put therein flowers of sulphur until the liquid surface be four inches upmost; boil it for a considerable while over the fire; this will cleanse and purge the sulphur from its unctuousity and corruption, and qualify it for your purpose. Separate the lye from the sulphur, and drying it, you'll have it white, fixt, and incombustible, exceeding proper for the goldsmiths to make use of on gold.

*To extract spirit of Saturn, an excellent ingredient for Enamel and glass-work.*

We think fit to propose all the preparations proper for making a *red Enamel*, before we shew the way to make it, because the ingredients to be used must first be provided, in order to proceed regularly to our business.

Reduce good litharge, as much as you please, to an impalpable powder, and set it in a glaz'd earthen vessel over a still fire; add to this good distill'd vinegar, till four inches above it; mix them well together, and then let them settle until the vinegar become milk-colour'd, which will be in a little time; decant this vinegar off gently, and put on fresh, continuing to do thus until it admits of no more colouring; then put all the milk-colour'd vinegar into a glaz'd earthen vessel, and let it stand until the lead precipitate to the bottom; from whence pour off the clear vinegar, which will be at top; and that milk-colour'd sediment which remains, is what we call spirit of Saturn, tho' improperly; and that which we make use of for the *Enamel* and glass.

If it do not precipitate well to your liking, and that the vinegar at the top be not clear, cast some cold water among it; if that won't do, and that your vinegar continues muddy, set all the  
water

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water and vinegar together over a gentle fire to evaporate, and thus you'll have the more spirituous part of your vinegar a sediment in the bottom of the vessel, which is exceeding useful for glass-work. Keep it together with the rest of the *Saturn* for use.

This noble preparation, which we call spirit of *Saturn*, does indeed contain it, but you must have skill to extract it thereout. To say that 'tis all spirit of *Saturn* is untrue, for 'tis that wherein the spirit is contain'd, and from whence it may be more easily and better separated, than from the mass of lead; I propose this first step towards extracting it as such, whereby the curious may succeed with little trouble.

*To make Enamel of a blood-colour red.*

To stain *Enamel* of this colour, take ten pounds of common fritt, add to it six pounds of glass of *Saturn* prepar'd, make all into a very fine powder, which must be put into a glaz'd earthen pot at the glass-house furnace, to melt, boil, and refine; after this, cast thereon powder of thrice calcin'd copper at discretion, stirring all about that they may incorporate together with powder of red *tartar* until it be perfectly stained; and thus you'll have a delicate deep fanguine *Enamel* fit for all manner of work you can desire to apply it to.

*Another blood-colour Enamel.*

This *Enamel* will be very beautiful, and may serve instead of the rose-colour *Enamel* hereafter prescribed.

To make which, put ten pounds of fritt for crystal, and six pound of glass of *Saturn* before-mentioned into one of the glass-house furnace pots; let it melt and purge well; after this cast it into water, dry it, and return it into the pot; when 'tis well melted again, throw in at several times, five or six ounces of powder of thrice calcin'd copper, stirring all together with the iron crook to mix and incorporate them well together, and also a like quantity of powder of red *tartar*, still stirring it; this being well boil'd and refined, observe if the colour be perfect, if not, add equal parts of the powders of *copper* and *tartar*, as much as you find necessary to bring it to perfection. Let it remain to boil and purify, trying it again and again, until you find it completely colour'd.

*Another red Enamel of a very splendid ruby-colour.*

The beauty of this *Enamel* is very surprizing, and of as lively a lustre as the ruby it self, which it communicates to all the work wherein 'tis used.

For this fine effect, we must have recourse to the fusible *manganese*, of which add twenty ounces to each pound of crystal ground: let the whole be well purified; then try the colour, and according as you find it, add the greater or lesser quantity

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quantity of *manganese*, or crystal ground respectively, until it be brought to its just degree of perfection, as a ruby, and which ought to be very admirable.

### *Another ballas ruby colour Enamel.*

The same *manganese* must be had to make this fine colour; put ten pound of crystal ground in a glaz'd pot, to melt and purge at the glass-house furnace; throw the matter into water, dry it, and melt it over again; do thus thrice, and when the mass is afterwards well melted, tinge it with the fusible *manganese* as before, and 'twill become purple-colour'd. Add to it at eight times impalpable powder of alum to bring it to a red. Be very careful that the alum do not blacken it; but rather make it yellowish, and the *manganese* dissipating, 'twill become red, and so make the colour most perfect and just, of a fine ballas ruby.

### *Another Enamel of a rose-colour for gold.*

Take ten pound of crystal ground, melt it at the glass-house furnace in a glaz'd pot; add to it at four times five ounces of red calcin'd copper, stirring the metal every time; then put into it *crocus Martis*, and *manganese* prepar'd as before; then let it alone to cleanse for six hours, and if the colour is not true, put in by little and little more *crocus Martis* until it be of a fine rose-colour.

### *Another very fine rose-colour.*

Among our rose colour *Enamels*, this seems the finest; to make which, take four pounds of *crystal* ground, let it melt in a glaz'd pot at the glass-house furnace; cast it afterwards into water, and melting it over again, add by little and little an ounce and a half of *calx* prepar'd, stirring the metal every time to incorporate; then let it alone for a little while, until you perceive it of an ash colour; when it comes to that, forbear putting in any more *calx*, lest you make it too white; then refine the mass, and after add to it minium two ounces, purge, refine, and throw it out into water, and putting it into the pot, let it stand to melt, and purify over again about eight hours; then put in an ounce and half of red thrice calcin'd copper, and as much crude white *tartar*, with a dram of blood-stone, and the like quantity of fixt sulphur; these pulveriz'd very fine and mixt together; stir the metal, and incorporate them very well together: afterwards see if the colour answers your expectation; if it be too deep, add a little more *manganese* to weaken it; if it be too pale, improve it with some more of the last composition of *copper tartar*, blood-stone, and sulphur, until it be to your purpose. And thus you have an *Enamel* of an exceeding fair rose-colour.

*Another*

*Another rose-colour Enamel.*

Set six pounds of crystal ground in a glaz'd pot at the glass-house furnace to melt and cleanse; then cast into it at four several times intermitting, four ounces of calx as prepar'd of lead and tin; stir the matter very well at each time until it incorporate; then let all purge for a while, and cast it ladleful by ladleful into water, and again put all into the pot to melt and refine anew; after this, add to it an ounce and a half of red copper pulveriz'd and calcin'd, which will tinge the whole of a deep colour, but cast it in at three intervals, and stir it very well to incorporate. Two hours after, add to it at thrice, an ounce and a half of *crocus Martis*; mix it well as before, and let it remain to refine about three hours; then throw on it six ounces of *tartar* calcin'd, chimney foot vitrified one ounce, *crocus Martis* again one ounce and a half pulveriz'd, and all well mixt at four several intermissions and quantities, stirring the metal always with the iron-crook; let it swell, but not boil over. After this, let it repose and purify about three hours; stir it again and try the colour; if it be red as blood, it's right; if not, add at discretion, a little more of each of these powders of *tartar*, foot, and *crocus Martis*, until the colour be full and true, and so let it stand for a whole hour, and try it again; if you find it perfect, proceed no further, but keep it for use, 'tis very proper to apply to gold for *Enamel*.

*Another splendid Enamel of a carbuncle colour.*

Take very pure gold, and for the better assurance, refine it your self, and dissolve an ounce of it in three ounces of *aqua regalis*; let the solution distil over a gentle fire until the gold precipitates, and thus repeat an exhalation and cohobation six times, and the last time take out the gold; powder and put it into a crucible cover'd and luted, on a reverberatory to calcine; let it remain until it become of a very excellent and scarlet red, which will not be without a considerable allowance of many hours.

This done, take of the crystal ground, and melt a quantity of it in a glaz'd pot at the furnace of the glass-house; and being well purg'd, throw in a twentieth part of the powder of gold, in proportion to the quantity of the metal, stirring the whole very well; let it alone for some time; then try it, and according as you find the colour, put in more powder, until you bring it to a true transparent carbuncle-colour.

We have given another way to calcine gold, no less sufficient than this, together with a way to make a fine carbuncle; and this rare colour may as well be given to the stone as the Enamel, by the directions for preparing the gold; the curious may choose which they will, they being equally sufficient.



*The way to calcine copper for making vitriol of Venus, without corrosive.*

The calcining of copper is the first preparation to be made in making the *vitriol* of *Venus* without corrosive, which is known to very few, and whereof we have already given an eulogy.

Take thin leaves of red copper, and put them into crucibles, stratifying them layer upon layer with powder of common sulphur, filling your crucibles until all the copper leaves be put in; then cover well, and lute the crucibles; let the lute dry; and put them into the furnace, continuing a good charcoal fire for two hours; afterwards let them stand and cool; then take off the crucibles, and you'll find your copper calcin'd and blackish, inclining to a deep purple powder; searce it, and to each pound add six ounces of powder of sulphur; mix, and put them into a round flat-bottom earthen pot, strong enough to bear the fire; lay upon the furnace a strong earthen dish, fill it with very live coals, and place your pot thereon with the copper; when the pot grows hot, and the sulphur takes fire; stir it with your long iron crook, lest it should stick to the pot, or become concrete; continue thus till the sulphur be all consum'd and smoaks no more; take the pot hot off the fire, and empty the copper out with an iron ladle; pound it well in a brass mortar, and searce it all finely, and you have a blackish powder; reiterate this calcination thrice, with the like proportion of sulphur as before, and the third time let it remain until the copper become red and yellow; then take it off and pound it in a brass mortar, and searce it finely, pounding what remains over again, until all be searc'd, and you'll have a very well colour'd *calx* of copper, most effectual and proper for extracting this fair *vitriol* of copper, whereof the following is the preparation.

*To make vitriol of Venus without corrosive.*

Those who make *vitriol* of *Venus* have not all one and the same method, most of them dissolve the copper in distill'd vinegar, spirit of *nitre*, or some other corrosive; for our part, water alone is the dissolvent, or rather agent to extract the tincture, as we shall shew.

Take glass cucurbits as many as will serve your purpose, to contain all your *calx* of copper, and put six pound of fair running water to a pound of *calx*, into each cucurbit; place them on a moderate sand furnace for four hours, to evaporate until one third of the water goes off; let the furnace cool, and afterwards decant the remainder of the water into other glass-vessels, and dry the sediment in a crucible on the furnace. Let this water settle for two days, and then you'll find in the bottom of the vessel small grains of copper of a blackish colour; you must filtrate or strain the



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the water, and preserve all the grains together, to add to the former sediment, having first well dried them, and keep the water.

Take all these sediments, and to each pound add six ounces of sulphur powder'd as before, putting it into your flat-bottom'd earthen pot to calcine; take care to stir it well as long as the sulphur fumes, and it stands over the fire, else it will stick to the pot, and not calcine; take it off and powder it immediately in a brass mortar; searce the powder, and you'll find it black; mix this again with sulphur proportionably, six ounces to a pound, and put it to calcine anew, stirring it very well as before directed; let it stand a while on the fire to alter the matter from a russet to a yellow; then take it off and pound it instantly in a brass mortar before it cool, and then searce it all finely over.

Put a pound of this powder with six pound of water into each cucurbit, and these cucurbits on a slow sand-furnace, where let it stand four hours to the consumption of one third of your water, which decant into other vessels; let it settle two days; then filtrate these waters, and pour them among the former, gathering the sediments that remain in the bottom, and mix them with these in the cucurbits.

Dry the remaining sediments as before, and repeat the calcination anew with the same proportionable quantity of sulphur; then extract the tincture, filtrate and mix the filtrated and tinged waters with the former, exactly observing the order already taught, and continue to do thus six times, so will the copper remaining in the bottom of your vessels become as it were a soft impure earth depriv'd of all its blueness, which throw away as fit for nothing; for all the virtue of the copper is contained in the waters; put these all carefully together to extract from them this precious *vitriol of Venus*, as hereafter directed.

*The way to extract a fair vitriol of Venus from our coloured waters.*

Of all the preparations to be taught for this rare work, this is the most easy and common, there being no more required, than to evaporate and crystallize the matter; but as we are to leave nothing in the dark, we resolve to explain every circumstance thereof for the benefit of our readers, and such as would know it.

We have said you must mix all your colour'd waters, now we will tell what must be done with them; you must have a low glass-cucurbit that will hold two quarts or more, which put into a moderate ash or sand-furnace; put therein three pound of the tincture to evaporate gently, and put the rest into glass-bottles set round your furnace, so that they may be heated, and ready to fill the cucurbit as fast as the exhalation consumes its tincture,

tincture, which may be done with a glass ladle, or the bottles themselves, lest the waters being cold might cause the cucurbit to burst, and so all would be lost.

Reduce ten pound of this by evaporation to two and a half, or three at most, which will be a very high tincture, pour it into two or three glazed earthen vessels, and place them all night in a moist cold place, and you'll find the vitriol at bottom, and sticking to the sides of the vessels, like little long icicles, which will have the true colour of oriental *Emeralds*; pour all the remaining waters into the cucurbit, and dry the *vitriol* that it may not stick, preserving it in a close vessel.

Place your cucurbit again on the furnace to evaporate anew to the consumption of half the waters, and crystallize the strong tincture as before. Thus whilst any water remains, evaporate and crystallize until all be consumed, to the end that none of this may be lost, whose vertues are infinitely useful, not only in the *art of glass* and the *metallick*, but in *physick* too, for the curing of many distempers, which we will pass over as foreign to our subject, and go on in prescribing the rest of this rare work, and conceal nothing from the curious, but give them entire satisfaction.

*The method of drawing the spirit of the vitriol of Venus, which has a wonderful blue, and how to separate the caput mortuum for tinging of glass.*

Put a pound of this *vitriol* into a glass retort strongly luted, the lute being dry, set the retort in a sand-furnace, fitting to it a very large receiver, as directed for *aqua fortis*; this done, kindle the fire, and continue it gentle for four hours to prevent a too excessive heat, which would drive out the spirits impetuously, and so burst the receiver, whereof great care must be taken not to spoil all. As soon as the spirits ascend like white clouds, improve your fire by degrees, until they disperse and your receiver clears again and cools, and all the spirit comes together: then let the fire go out of it self, and after twenty-four hours, unlute the joints, take away your receiver, and put the liquor it contains into glass-bottles, and stop it very close with glass-stopples to prevent air, which if they could draw, would disperse it all by exhalation. This choice liquor has that noble blue which affords us wonderful tinctures, and other inestimable operations, as well as such surprizing effects in physick, as cannot be equalled.

But to return to our *caput mortuum* of this precious *vitriol*, which has occasion'd us to give its preparation, and is what we make use of for this fine water-colour, or *egmarine* on glass, you'll find it in the retort, out of which the white spirit was distill'd, whereof we have already treated. To get it, you must  
break

break the retort; then reduce it to powder with a mixture of *zaffer*, and so tinge your crystal of an admirable sea-green colour.

We were mistaken in saying before, that the *caput mortuum* must be expos'd to the air before you pound it with the *zaffer*, for that is not altogether incumbent in tinging of glass, tho' this exposing of it cannot but add something to the lustre, for it draws thereby with a certain magnetick property, the occult spirit of the air, and so from a black, of which it was before, becomes of a pale blue colour, and partly assumes what is lost by distillation and extraction of the spirits, so you may save a great deal of time and pains by this preparation, to your no small advantage in expediting the matter.

*The way to Enamel in all sorts of colours on gold and other metals.*

The ancient works of *Enamel* on metals, were only of black and white, with some few tinges of carnation, or flesh-colour, as may be seen in the *Limoge Enamel*. In *Francis* the Ist's time it became more improv'd, and they made use of *lights* and *shadows*; but the *Enamel* on gold was of no better stuff than that on copper, and all the works of it on gold, silver, and copper, were of transparent matter; such as wrought it on thick, couched each colour by itself, as is done now a-days in enamelling some particular pieces of *relief*, and not otherwise.

Since they have found out the way of enamelling with opake and thick stuff, and the art of compounding the colours is much more improving and handsomer than that of the ancients, as is visible in all our modern works; we must without all exception, own the fair works upon gold, representing portraitures and entire histories, so neatly, and to the life, and coveted as much as picture done in oil, over which it has the advantage of natural lustre and varnish, which is never tarnished, to be the invention of this latter age, and the improvements therein we owe to the *French*.

All sorts of *Enamel* are not to be promiscuously employed on all sorts of metal. Gold which perfectly bears with, as well all the opake as transparent, cannot agree with clear purple, its yellow mightily changes the colour thereof, and produces but a very ill fancy. On the contrary, this purple is very fine on silver; so the egmarine, the azure, and green, all other colours, as well clear as opake, disagreeing therewith; and copper suits with every thick *Enamel*, but cannot endure the limpid, unless prepar'd for it beforehand, as shall be shewn in due place.

Observe, that good *Enamel* must be hard and lasting, such as is soft being full of lead, and subject to change colour, easily becoming sullied and foul. Of the clear *Enamel*, some is harder,

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some softer; the hardest is always the best, however, even of them there is choice; some lose colour in the fire, some are more or less lively and sparkling; but if you employ constantly such as we have before prescribed, you'll never meet with those inconveniences; for the ingredients being perfectly cleansed, will endure all degrees of fire, any change of colour or quality not ensuing.

### *Of the furnace for enameling and portraying.*

The enameling of metals, as well as the colouring of the stuff, cannot be effected without fire, and is wholly different in this point from painting with the usual colours in oil, which may be dried in the air only, without other help.

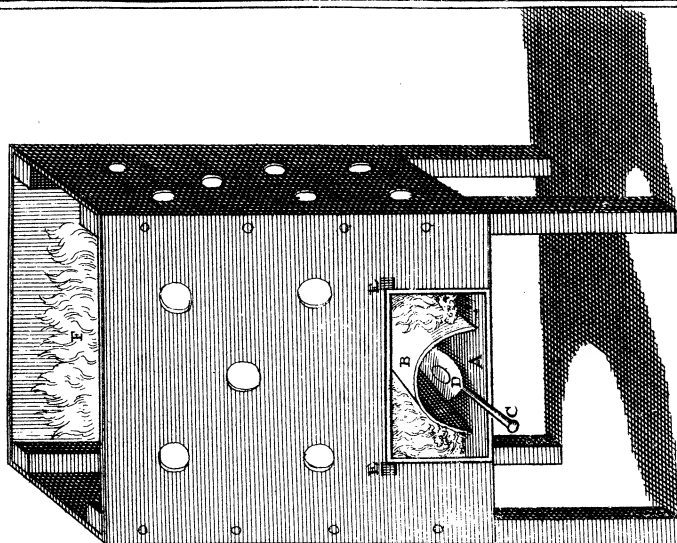
It would be very hard to believe the fire would not spoil the mixture of the colours, if our daily experience which we made, did not vouch the contrary; however care must be taken not to let the work have too much time, but draw it out as soon as you find it polished.

The fire must be reverberatory, or rather of suppression, and never to be under the stuff; 'tis the same as is used for cleansing of metals, whether in mints or goldsmiths shops, which is very familiar to all the world.

You must have the furnace round or square, either of iron or earth, it's no great matter, how (or whether of these) it is, which must be hollow in the middle, to contain the work with a good charcoal fire all about, and over it, to make it melt the better; and you must have it so as to be able to take your stuff out, and put it in again, as occasion requires. You may, for better conveniency, make use of a goldsmith's muffle; 'tis a small arch, made of crucible earth, in the shape of half a crucible, cut lengthwise, and they place it on the area or floor of the furnace, the opening of it lying just against the mouth of the furnace, to put in and draw out the work easily; and for more conveniency, they place a small grate over it, which must not touch it, for fear of breaking it; and on this grate make a good fire, and so round about the muffle, to heat the hollow very well, under which they put the work to be enamel'd and painted; and the essays or trials they have a mind to make on a little iron-shovel, to draw the easier out; but for making essays of ingredients for *Enamel*, it must be a little blade of white *Enamel*, which ought to be provided purposely for that use.

### *The way to Enamel gold.*

We have already said, that gold, silver, and red copper may be enamel'd; now to make true work, you must use only pure gold, because silver makes white *Enamel* appear yellow, and copper rises in scales, and makes vapours; for though all *Enamel* sticks to it, yet it is but very imperfectly, and may be easily divided



- A. The mouth of the Furnace
- B. The lower
- C. An iron Peel
- D. The Scum to be melted
- E. The Grates
- F. The inner part of the Furnace



vided and peel'd off again ; besides, the colours are so wretched on it, that they lose much of their charm and lustre by the impurity of that metal.

Therefore, if you would have good work, let gold only be your subject, and of the purest, if you employ clear *Enamel*, because on impure gold they grow dull, and become imperfect, that is to say, there appears with this a certain obscure and cloudy vapour in the *Enamel*, which deadens and takes away the life of its colour.

The gold plate ought to be rising, and when it is forged very even, the goldsmiths apply white *Enamel* over and under it, tho' it is to be wrought but on one side ; but this is necessary for two reasons ; first, because the work is neater and fairer for it ; and again, because if it were only enamel'd on one side, the fire would swell it, and so make it rise, and that in bubbles ; because it is always as it were tormented, especially when the pieces are great, and the *Enamel* carelessly laid on ; this makes it produce blisterings, which disfigure the work. The *French* chymists call such *vegeter*, but their goldsmiths *petits ouillets*. This disfiguring of the work, you may avoid, by laying *Enamel* on both sides of the plate of gold, and thicker over than under. This will keep it equal and even on both sides, the first lay of white *Enamel* remaining smooth in this condition, serves for a field to place all your other colours on as we will farther discourse of in the art of portraying.

Oil of *spike* is used for dissolving thick and opake *Enamel* before it can be applied ; for the transparent you need use nothing but fair water, as we shall shew anon ; and then 'tis couched flat and border'd with the metal, and sometimes we don't border at all, the field being *Enamel* ; but this is troublesome, because the limpid *Enamels* as they melt, often mix, and so confound the colours, which constantly happens when the pieces are small.

Red *Enamels* are not so, unless by chance, and come generally yellowish out of the fire ; as soon as 'tis applied to the gold, it alters the colour ; one may soon bring it to a perfect red *Enamel*, by turning it at the mouth of your furnace, when you are taking it out from the fire ; and then it is that the workmen say they make it red, and give it its compleat colour.

Gold, as we have already said, admits of all sorts of *Enamel*, clear or opake, bright purple excepted, which is altered by the yellow-colour of the gold, and does not take so good effect there, as on silver, on which it ought still to be used. The way of working every sort of *Enamel* is alike.

*To Enamel on silver.*

We have already taken notice that silver agrees not with all sorts of *Enamel*, as gold. We repeat it here again to prevent



the use of any but such as serve to produce perfect and agreeable effects.

You are to make least use of white *Enamel* on silver, because there it becomes yellowish, and unpleasing; but nothing can suit better with it, than bright purple, green, blue, and egmarine, because the whiteness of the silver is then clearly eminent, and gives its just splendor.

The work and manner of enamelling on silver, is no way different from that of gold, in forging the plates evenly to prepare them for the *Enamel*; you may make use of white on the under side, since the *Enamel* there serves only to qualify the risings and disturbings of the metal in the furnace, which would cause unevenness, or disagreements in the surface, and prevent its becoming just and handsome.

We need not repeat again that way of placing the *Enamel* on your plates of gold or silver, and so to put them into your little reverberatory furnace (spoken of before) to melt, and as soon as polished to be taken from the fire.

*To Enamel on copper.*

Though we have before touched upon the way of enameling on copper, yet lest the reader should too slightly apprehend it, we shall therefore treat of it here to avoid imperfection.

The less use is made of this metal in this work the better, for the *Enamel* never sticks to it perfectly, but is easily scaled, divided, and broken off, which never happens to gold; besides, the copper is so impure, that its fumes destroy the beauty of the *Enamel* so much in the furnace, that they quite lose their charm and splendor by the malignity of those vapours.

Though the copper receives easily all thick or dark *Enamels*, it can't be brought so well to endure the clear and limpid; now if you would make use of these last, you must first lay a lay of green, or black, and thereon a leaf of silver to receive the *Enamel* suitable for that metal mentioned before; so that in the main 'tis much better to make use of silver for the transparent *Enamels*, since the copper is so apt to foul, and the change in either the same.

In enameling on copper, you must take a plate of red copper forged smooth and even, applying your *Enamel* of what colour you desire above and under the plate as before; then put this into the reverberatory furnace, and when it receives its polishing, draw it out.

*To prepare the Enamel for the metals.*

Before you apply your *Enamel* on the metal, you must give it this little preparation, which is the easiest, and best approved of by the goldsmith. We will instance it in white *Enamel*, because that is more generally made use of than any other.

Take

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Take white *Enamel*, pulverize it very fine, pour on it a little *aqua fortis*, and let it afterwards purify and refine in a small glass cucurbit.

Wash it afterwards often in fair water, dry and keep it in a close vessel for use.

To make use of it, first pound a quantity thereof in a stone mortar, wetting it with a little water, and so spread it on the plates, and into the furnace with it as before.

Thus do with all your clear and transparent *Enamels*, and you'll have all your things in a readiness to go on with your work as you think convenient.

*To prepare the colours for painting on Enamel.*

Nothing can be more splendid than the paint on *Enamel*, and for this use must be chosen the liveliest and most noble colours, and such as will easily vitrify and melt.

All these before assigned, are as equally sufficient for this, as for enamelling; if you grind them first on your marble with the best oil of *spike*, or mix them together with the other ingredients for that purpose, as we shall give a fuller account hereafter, and of all the matters to be used with calcined *Enamels*, which serve to make up the paint for *Enamel*, mixing them well together, as painters do on their pallets. When you want some colours of *Enamel*, you may with blue and yellow make a good fair green; a blue and red mixt, will produce a fine violet; a red and white creates a rose-colour; a black and white forms a gallant grey, and so of others.

Every workman has his own secret, and peculiar way of working; but most of them make use of *rocaille* for varnishing their colours, which has an ill effect, because of too much lead, which is not perfectly purged off. This lessens the life and splendor, and it always continues as it were tarnished, cloudy and dull.

But our *Enamel* being well refined, will produce work so fine and agreeable, that 'tis not possible to find any thing so illustrious and accomplish'd; and such as for their own private diversion would work herein, and have not the conveniency of a glass-house, may be easily furnished, by proceeding to make one according to directions given. See the plate in the article FURNACE.

Notwithstanding the sufficiency of our *Enamel* for affording all sorts of colours and tinges in painting on *Enamel*, we will yet prescribe other means for this, no way inferior thereto, to answer the advantage and curiosity of those who work at this excellent art.

*To make white for painting on Enamel.*

The best workmen, for the most part, use the white *Enamel* ground, which they can manage with address enough to

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heighten and illustrate their *lights*, which is necessary to be done to all their colours, as in miniature. But as it is difficult to preserve the ground justly for improving those other colours, and ordering the compositions (all one as in carnation) you must take of our crystal ground, prepared with tin and lead purg'd and refin'd as before-mentioned, or rather of our milk-colour *Enamel*, which is the fairest can be made; cleanse it with *aqua fortis*; wash, dry, and grind it afterwards with oil of spike.

Or you may prepare another white ground without lead, thus: take very pure tin calcin'd, and let it vitrify in a glass-house pot, with eight times as much crystal fritt, as we have directed the preparation before-mentioned. Pulverize these very fine, and proceed precisely, according to prescription for purification, &c.

### *To make a black for painting on Enamel.*

Though the black *Enamels* prescribed before, and those succeeding it, may serve to paint on *Enamel* with this colour, without any other preparation than grinding it with oil of *spike*; yet we will add here another black no less excellent and fine, arising from equal parts of black *Enamel*, and *peregrine* well calcin'd; mix, and reduce them to an impalpable powder, and then apply oil of *spike*, and you'll have a colour which will take with great facility on the *Enamels*.

### *A yellow for paint on Enamel.*

We will only make use of our *Enamel*, prepar'd as before, mixt and purified with *aqua fortis*, and after wash'd in clean water, as before-mentioned; dry and grind this powder with oil of *spike* on your marble, and 'tis fit for use. With this yellow and blue, as we have already hinted, may be made a fair green; but those *Enamels* described before are so just and fine, that 'tis needless to use any other for that purpose. This preparation for the yellow here laid down is sufficient also for it, without any farther trouble.

### *A blue to paint on Enamel.*

The *Enamels* of this colour assign'd before, are the noblest can be used in this work; purify them with *aqua fortis*, and grind them with oil of *spike*, as before directed for the other colours.

You may, because it is vitrified, make another blue fine enough, thus. Take painters *Enamel* prepar'd; add to this (put into a glass-bottle) best rectified *aqua vitæ*, enough to drown the stuff by four inches; stop it well, and set it in the sun-shine five or six days, shaking the bottle well three or four times a day, that the purer *Enamel* may dissolve, and the grosser fall to the bottom. Take the *Enamel* out of your bottle, and steep the *feces*, letting them precipitate as useless; then evaporate your *aqua vitæ*, and dry your *azure*, which will be a very fine  
well

well cleansed matter for all sorts of this work ; grind it after on your marble. This *Enamel* so prepar'd, is most proper for painting, and far beyond the *ultramarine*, so much used.

*A red paint for Enamel.*

There can nothing exceed the perfection of our *Enamels* of this colour, taught in eight several articles before-mentioned ; the like may be said of our *blood-colour*, *rubies*, *rose*, and *carbuncle*, which is the most exalted ingredient for *enameling* metal, or making paint on *Enamel* ; and those who practise this fine art, use no other than that of the glass-house, or such as they make accordingly. Now this red *Enamel* is prepar'd as the other colours with *aqua fortis* to purify it, wash'd, dry'd, and ground with oil of *spike* for your use.

There is yet another tolerable red, which they paint with on *Enamel*, in which is employ'd calcin'd gold ; but this would be much more improv'd, if instead of their *rocaille*, they made use of our matter made of crystal and *Saturnus glorificatus*, or of our principal prepar'd powder before prescrib'd, for these are exceedingly well purified, whereas the *rocaille* has too great a surcharge of lead, the impurity whereof always renders the work defective.

One takes an ounce of fine gold in very thin plates, these dissolv'd in eight ounces of *aqua fortis*, and regulated with *sal armoniac*, or old strong salt, in a small glass matrass ; this is put into a glass-cucurbit, wherein was already pour'd eight *Paris* pints of spring water, and six ounces of *Mercury* ; the cucurbit is plac'd on a still fire, and after twenty-four hours, the gold descends to the bottom in a light land-red powder ; then the water is pour'd off leisurely into an earthen glazed receiver, or pan, and the powder gather'd and dry'd by a moderate heat, and with a *shamois* skin they separate the *mercury* from the gold, and grind this powder with twice its weight of flowers of *sulphur* together ; and then put all into a crucible over a small fire, where the sulphur will communicate it self with the rest, and then evaporating, they find the powder somewhat ruddy, which ground with *rocaille*, is what they make use of on the *Enamel*.

We own this calcination to be tolerable as to the gold ; but as for mixing the *calx* with the *rocaille*, without melting them together to incorporate, is disputable. We believe that in grinding them together with oil of *spike*, they may in some sort incorporate as other colours, but can never so perfectly unite ; besides, the crystal matter does not so well receive the colour of the gold this way, as if it were done by fusion.

Others make red inclining to vermillion, which they use in painting after this manner. Take vitriol calcin'd in two crucibles

well luted together, and set for an hour over a slow fire ; then purge it with *aqua fortis*, wash it in fair water, and grind it with oil of *spike* as before, and so make use of it for *Enamel*.

All red *Enamel* which is good, ought to be hard, and not easily consumed in the fire ; for that which is otherwise, contains much lead, and soon becomes dull and sullied, and is not of so lasting a substance, which the workmen ought to be cautious of.

To finish the preparation of *Enamel*, and before the manner of painting them is prescrib'd, observe, that all the colours before-mentioned, which are not pure *Enamel*, ought to be incorporated with a crystalline matter, such as we have prescrib'd, to the end they may vitrify the better, which else they'll not easily do, though most workmen make use of their *rocaille*, whether to avoid the trouble of making (or that they are ignorant how to prepare) a better matter ; and this has obliged us to give several ways very good and true for this purpose to make fine and perfect work by.

*The way to paint on Enamel.*

This art is revered by all nations, 'tis so fine and so excellent, that the first and noblest persons in the world practise it, as we have said elsewhere. It is certain that the art of painting on *Enamel* is modern, but no less estimable for that, since its effects are so wonderfully beautiful, so infinitely lasting, of so natural a gloss, and their splendor never to be defaced.

If it were possible to make large works of *Enamel*, as is done in picture, they would be inestimable because of their lustre, and so far surpass what antiquity has had such great respect for, and which these latter ages still cares with extraordinary esteem.

This way of painting on *Enamel* seems much more difficult than limning ; practice however convinces us, that they are equally easy, and we can with as little trouble represent history on *Enamel*, as in limning ; the difference lies only in preparing the colours, which is not done the same way ; for we dry and varnish our *Enamel* paint by fire, whereas that in limning is done by the air.

To paint on *Enamel*, you must have a plate of gold enamel'd with white, on which delineate and portray your design. This done, draw it over again in dark red ; the piece being perfectly done off, and the lines complete to the subject, set the tablet, or piece in the muffle, on a reverberatory fire, to settle as before directed.

Your tablet being taken out, apply the colours in a just order as in limning, with this difference only, that here you make your white ground serve for filling, where that colour is required

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quired to set off the heightnings and lustre of the *lights*, as is done in miniature; and because it mightily contributes to the heightening thereof in the other colours as to improving their *lights*, according to the directions before-mention'd.

When the piece is thus finish'd, put it again into the furnace to fix the colours, and as soon as you perceive it varnish or polish, draw it out, lest the colours mix and spoil each other.

You may take out the work again, and revise it as often as you please, only putting it still into the furnace, until it receives its just gloss, &c.

This way of renewing and revising the tables, is done in limning with oil; and the painters observe, that the pieces must not be handled until they are well dry'd in the air, so those in *Enamel* must be let alone until they receive their perfection from the fire.

This is all to be observ'd in painting on *Enamel*; it remains only for us to shew how to prepare your dark red for tracing the design; you may have it thus.

Take the *caput mortuum* which remains in the retort, after the *aqua fortis* is made of your *vitriol* and *nitre*, grind it with oil of *spike*, and so you have the dark red ready for your use; or you may make it with *crocus Martis*, ground with oil of *spike*.

THE END. The scope whereunto all operations are directed is represented in painting, by an old decrepit man with a grey beard, adorn'd with a garland of ivy; sitting with a sun departing from the east, and seems to be in the west by its rays; holds a pyramid with 10 MS on it, and a square with the letter *Omega*.

Decrepit because he has one foot in the grave, the ivy denotes his want of support, the *Omega* declares the end, as *Alpha* does the beginning; the 10 MS signify 10000.

ENGRAVING, is the art or act of cutting metals and precious stones, and representing letters, figures, &c. on them, *Engraving* is an art which teaches the way of transferring any design upon copper, brass or wood, by means of sharp pointed instruments.

*Engraving* is properly a branch of sculpture, and is divided into several branches according to the matters it is practis'd upon, and the manner of performing it.

The original way of *Engraving* on wood is now distinguish'd by the name of *cutting in wood*; that on stones for tombs, &c. *carving* or *stone-cutting*; that perform'd on metals with *aqua fortis* is call'd *etching*; and that perform'd with the graver on medals, as copper, brass, steel, silver, &c. as also on precious stones, crystal, &c. alone keep their primitive name of *Engraving*, and that perform'd by the knife, burnisher, punch and scraper is call'd *metzo tinto*.

The

The art of *Engraving* is for the greatest part of modern invention, not being older than the sixteenth century.

It is true indeed, the ancients did practise *Engraving* on precious stones and crystals; some of which works are still to be seen, equal to any production of the latter ages; but the art of *Engraving* on plates of metal or blocks of wood in order to form prints from them, was not known till after the invention of painting in oil.

The discovery of this art is ascrib'd to *Maso Finiguerra* a goldsmith of *Florence*, who being accustomed to take impressions of every thing he cut in clay, and to cast melted sulphur into this mould, at length found out the way of taking the impressions of them on paper, by smearing the figures of sulphur with oil and lamp-black.

The secret was not long e'er it got abroad, and coming to the hands of *Albert Durer* and *Lucas*, they greatly improv'd it, and began to engrave on wood and copper, and succeeded to admiration.

ENGRAVING in copper is employ'd in representing divers subjects, as portraits, histories, landskips, foliages, figures, buildings, &c. either after paintings or designs made for the purpose. This is perform'd either with the *graver* or *aqua fortis*; as for the *graver*, you must procure a copper plate, according to the size of the thing you would engrave on it; this plate must be well polish'd; then having your design drawn or trac'd over in loose, *i. e.* ungummed ink, warm the plate over the fire and smear it lightly over with a thin skin of virgins wax, and on this lay the draught or design, done with ungumm'd ink, or red chalk, or black lead, &c. and rub it hard down that the wax may lay hold of it and take it off.

Having thus transferr'd the design upon the wax, it is to be trac'd through the wax upon the copper with a point or needle; then you must heat the plate over the fire, and wipe off all the wax, and the strokes drawn on it with the needle, &c. will remain; which are to be followed, heightened, &c. according to the tenor of the design with the *graver*, which ought to be well tempered, and very sharp.

All the art consists in the conducting or guiding the *graver*, which depends not so much upon rules as practice, the habitude, disposition and genius of the artist.

The instruments necessary for this performance, are a round cushion or sand bag, made of leather to lay the plate on, to give it the necessary turns and motions, a *burnisher*, made of iron or steel, round at one end, and usually flattish at the other, to rub out slips and failures, soften the strokes, &c. a *scraper* to pare off the surface on occasion, and a rubber of black hat or cloth,



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cloth, roll'd up to fill up the strokes, that they may appear the more visibly in order to know how the work proceeds.

ENGRAVING with *aqua fortis* is call'd ETCHING, which see.

1. The chief instruments us'd in *Graving*, are four ; 1. Gravers. 2. An oil-stone. 3. A cushion. 4. A burnisher.

2. Gravers or graving tools are of three sorts, round-pointed, square-pointed and lozenge.

*The round are the best for scratching withal, the square-pointed ones are for cutting the largest strokes; and the lozenge-pointed ones, for the most fine and delicate strokes; but a graver of a middle form between the square and lozenge-pointed, will make the strokes or hatches appear with more life and vigour, according as it is manag'd in working.*

3. The oil-stone is for whetting the gravers upon, this ought to be very smooth, but not too hard, and without pin-holes.

This is us'd as follows ; *having put a few drops of clean olive oil upon the stone, lay that side of the graver that you design shall cut the copper, flat upon the stone, whet it very flat and even, and for that purpose you must take care to carry your hand stedfast with an equal strength, placing the fore-finger firmly upon the opposite side of the graver.*

*Then turn the next side of the graver, and whet that in the like manner, that you may have a very sharp edge for an inch or more.*

*Then turn that edge that you have whetted uppermost, and setting the end of the graver obliquely upon the stone, whet it very flat and sloping in the form of a lozenge (with an exact and even hand) making a sharp-point to the edge of it.*

*If the graver be not very good, and very exactly and carefully whetted, it will be impossible to perform the Graving with niceness and curiosity.*

5. The *Graving cushion* is a roundish, but flattish leather bag filled with sand to lay the plate upon, on which it may be turn'd easily any way at pleasure.

*The plate must be turn'd with the left hand, according as the strokes which you are engraving turn; this is to be attained by practice and diligent care.*

5. The *burnisher* which is an iron tool is us'd in rubbing out scratches, specks or other things, which may cause faults in your work on the plate ; and also if any strokes shall happen to be cut too deep or gross, to make them appear less and fainter by rubbing them with it.

*Of the making of Gravers.*

1. You must be provided with some cross-bow steel, and procure it to be beaten out into small rods, and softened, and this being done,  
you

## E N G

*you may with a good file shape them as you please; this being done, heat them red hot, and immediately dip them into soap, which will render them very hard.*

2. In doing this observe, that in dipping them into the soap, if you turn your hand never so little awry, the *Graver* will be crooked.

3. *If the Graver prove too hard, lay the end of it upon a red-hot charcoal, till it begins to grow yellowish, and afterwards dip it in tallow (or as some say in water) and it will toughen it.*

4. Then having sharpened the *Graver*, strike the point of it into a piece of hard box wood, to take off all the roughness about the points, which was caus'd by whetting it upon the oil-stone.

5. In the last place, touch the edge of the *Graver* with a file; if the file cuts it, it is too soft, and will not work; but if it will not touch it, it is fit for the work.

*If the Graver breaks on the point, it is a sign that it is tempered too hard; but will oftentimes, after a little use by whetting come to be well conditioned.*

### Of POLISHING the COPPER plate.

1. Take a copper plate about the size of your work, that is to be *Engraven* on it, and that is free from fire flaws.

2. Hammer it very even and smooth on a smooth anvil; then take a pumice stone, free from gravel (lest it scratch it, and thereby cause a great deal of labour to get out the scratches) with a little water.

3. Then drop a few drops of olive oil upon the plate, and burnish it with your burnishing iron, and afterwards rub it well with the end of a piece of charcoal (made of beech-wood and quench'd in urine) dipt in water.

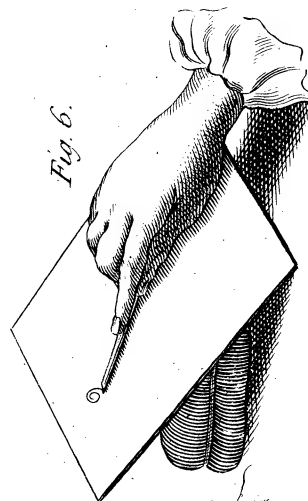
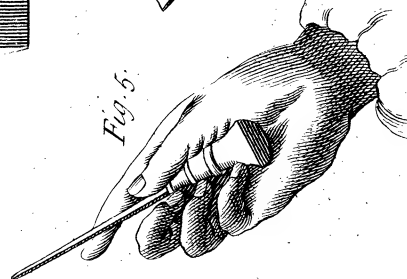
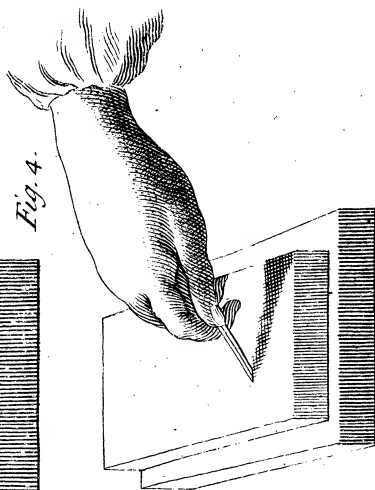
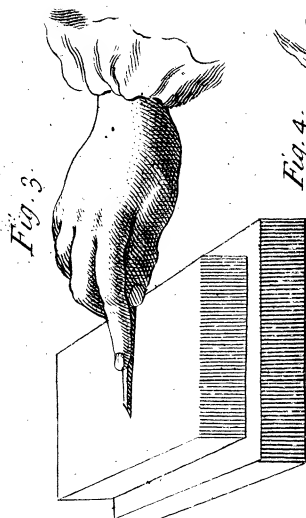
4. With a roller made with black felt, castor or beaver hat dipt in olive oil, rub it well for an hour or more, and your plate will be sufficiently polish'd.

### Of the manner of holding the Graver.

1. It will be proper to cut off that part of the knob of the handle of the *Graver*, which is upon the same line with the edge of the *Graver*; by this means, making the lower side that is held next to the plate flat, that it may not be any interruption in the *Graving*. See the plate.

2. For if you work upon a large plate, if that part of the handle of the *Graver* be not cut away, it will so rest upon the copper, that it will interrupt the smooth and even motion of your hand in making the strokes; and will cause the *Graver* to run into the copper deeper than it ought to do.

3. Place the knob at the end of the handle of your *Graver* in the hollow of your hand, and having extended your fore-finger





finger towards the point of the *Graver*, laying it at the top or opposite to the edge, which is to cut the plate; place your thumb on the one side the *Graver*, and your other fingers on the other side, so as that you may guide the *Graver* flat and parallel with the plate.

4. Take care that your fingers interpose not between the plate and the *Graver*, for they will be an hindrance in carrying your *Graver* level with the plate, and make the lines more deep, gross and rugged than you would have them.

*Of the way and manner of ENGRAVING.*

1. Having (as has been said before) a cushion filled with sand about nine or ten inches diameter, and three or four inches thick, and a plate well polish'd, lay the plate upon the cushion, being plac'd on a firm bench or table. See the plate.

2. Holding the *Graver*, as before directed, in making strait strokes, take care to hold the plate firm upon the cushion, move your hand, leaning lightly, where the stroke should be fine, and heavier where the stroke should be broader.

3. In making crooked or circular strokes, hold the hand and *Graver* stedfast, your arm and elbow resting upon the table, and move the plate against the *Graver*; for otherwise it is impossible to make those crooked or winding strokes with that command and neatness that you should do.

4. Take care to carry your hand with such a slight, that the stroke may end as finely as it began, and if there be occasion to thicken and make one part deeper or blacker than another, it should be done by degrees; and that you may do it with the greater exactness, observe, that your strokes be neither too close nor too wide.

For your more exact observation, you should practise by such prints as are more loosely shadowed, lest by imitating the more dark, you should not know where to begin or where to end.

5. After you have engraven one part of your work, it will be proper to scrape it with the sharp edge of your *burnisher* or other *Graver*, carrying it along even with the plate, to take off the roughness of the strokes; but in doing this, you must take great care not to make scratches in it.

6. And that you may the better discern that which is engraven, dip your roller made of felt or castor in oil, and rub the places *Engraver*.

7. Lastly, whatsoever shall appear to be amiss, you must rub out with the burnisher, and polish it again very nicely with your rubber of castor and oil, and when you have done you may boil your plate a little while in vinegar and rub it gently with your rubber beforemention'd.

*The method of Engraving COPIES or PRINTS.*

1. If you would have it print the contrary way, rub the back-side of the print with dust of black-lead, and lay it on the wax'd plate; and trace over all the out-lines of the design or print with a needle or drawing point, and you will find all those lines on the wax.

2. Take a drawing point not very sharp, and with the point thereof scratch or trace over every particular line or out-stroke; which when you have done it will not be difficult to mark out all the shadows as you engrave, having the proportion before you.

3. For copies of letters go over every letter with black-lead, or write them with ungumm'd ink, and clap the paper on the wax'd plate as before directed.

4. Or take a dog's tooth and rub the paper all over with it, not missing any place; which done, take the paper off the plate, and so will all the letters written with the ungumm'd ink be left exactly upon the wax.

5. Then take a *stiff*, and draw all the letters through the wax upon the plate, and take a linen rag or pencil brush, and cleanse the work from the loose wax, so will all the letters be drawn upon the copper.

*Of the IMITATION of copies or prints for ENGRAVING.*

1. Having a piece of bees wax tied up in a fine *Holland* rag, heat the plate over the fire, till it may be hot enough to melt the wax; then rub the plate with the wax tied up in the rag, till you see it covered all over with wax (which let be very thin) if it be not even, heat it again by the fire and wipe it over gently with a feather.

2. If you would copy a printed picture, to have it print off the same way, clap the print which you would imitate with the printed side next to the plate, and having plac'd it very exactly, rub the back side of the print with a burnisher, or any thing that is hard, smooth and round, which will cause it to stick to the wax upon the plate; then take off the print (beginning at one corner) gently and with care, lest you tear it (which may be caus'd also by putting too much wax upon the plate) and it will leave upon the wax the perfect proportion in every part.

*N. B.* If the print stick too hard to the wax, hold it to the fire, and it will come off with ease.

*Where take notice, that if it be an old picture, before you lay it upon the wax it will be best to track it over in every limb with a black-lead pencil.*

## E N G

ENGRAVING on *precious stones* consists in representing figures or devices either in *relievo* or *creux*, i. e. emboss'd or indented on divers kinds of hard polish'd stones.

The art of *Engraving* on precious stones, is one of those in which the ancients excell'd; as it appears by those antique *agats*, *cornelians* and *onyx's*, which surpass any thing of that kind the moderns have produc'd.

*Pyrgoteles* among the *Greeks*, and *Dioscorides* under the first Emperors of *Rome* were the most eminent *Engravers* we read of; the former of which was so esteem'd by *Alexander*, that he forbade any body else to *Engrave* his head; and the head of *Augustus* engraven by the latter was so beautiful, that the succeeding Emperors chose it for their seal.

All the polite arts having been buried under the ruins of the *Roman* empire; the art of *Engraving* on stones met the same fate, and was not retriev'd in *Italy*, till the beginning of the fifteenth century; when one *John* of *Florence*, and after him *Dominic* of *Milan*, perform'd works of this kind no way to be despis'd.

After their time, such sculptures became more common in *Europe*, and particularly in *Germany*, from whence a great many were carried into other countries, but these fell far short of the beauty of those of the ancients; especially such as were on precious stones, for as to those on crystal, the *Germans* succeeded well enough; as also did the *French* after them.

In this branch of *Engraving*, the things made use of are the diamond or emery.

The diamond which is the hardest and most perfect of all precious stones, is only cut by itself or with its own matter.

That which is first to be done, is to cement two rough diamonds to the ends of two sticks, big enough to hold them steady in the hands; and to rub or grind them against each other, till they be brought to the form desired.

The dust or powder that is rubb'd off, serves afterwards to polish them, which is perform'd with a kind of mill that turns a wheel of soft iron.

The diamond is fix'd in a brass dish, and thus apply'd to the wheel is cover'd with diamond dust, mixt up with oil of olives; and when the diamond is to be cut facet-wise, they apply first one face then another to the wheel.

*Rubies*, *saphirs* and *topazes* are cut and form'd the same way, on a copper wheel, and polish'd with tripoli diluted in water.

As to *agates*, *amethysts*, *emeralds*, *hyacinths*, *granates*, *rubies*, *sapphirs* and other of the softer stones, they are cut on a leaden wheel, moistened with emery and water, and polish'd with tripoli on a pewter wheel.



## E N G

Lapis, opal, &c. are polish'd on a wooden wheel.

To fashion and *Engrave* vases of *agate*, *crystal*, *lapis*, or the like, they make use of a kind of *lathe* like that us'd by pewterers, excepting that as the pewterers lathe holds the vessels, which are to be wrought with proper tools; that of the *Engraver* generally holds the tools which are turn'd by a wheel, and the vessels held to them to be cut and *engraven* either in *relievo* or otherwise; the tools being moistened from time to time with diamond dust and oil, or at least emery and water.

To *engrave* the smaller works of any of these stones, after they have been polish'd, such as seals, &c. they use a little iron wheel, the ends of whose axes are receiv'd within two pieces of iron plac'd upright, as in the turners lathe; to be brought closer or set further apart at pleasure.

At one end of one of these axes are fitted the proper tools, being kept tight by a screw.

Lastly, the wheel is turn'd by the foot, and the stone apply'd by the hand to the tool, and is shifted and conducted as occasion requires.

The tools are generally of iron, sometimes of brass. As to their form it is various; but generally bears some resemblance to chissels, gouges, &c. some have small round-heads like buttons, others like ferrels to take the pieces out, others flat, &c.

These tools are not apply'd directly against the stone, but as it were side-ways, thus wearing, and as it were grinding off the substance.

And still whether it be figures or letters or characters, the manner of application is the same.

The tools, as has been before said, are to be frequently moistened with diamond dust and oil of olives.

When the stone has been engraven, it is polish'd on wheels of brushes made of hogs bristles and *tripoli*.

As for works which are larger and less delicate, they make use of tools of copper or pewter made on purpose to polish the ground, or plain parts with *tripoli*, &c. which is apply'd after the same manner, as those wherewith the *Engraving* is perform'd.

ENGRAVING on *steel* is chiefly employ'd in cutting seals, punches, matrices and dies proper for striking coins, medals and counters.

The method of *Engraving* with the instruments, &c. are the same for coins as for medals and counters, all the difference consists in their greater or less *relievo*; the *relievo* of coins being much less considerable than that of medals, and that of counters still less than that of coins.

*Engravers*

*Engravers* in steel commonly begin with punches which are in relievo, and serve for making the *creux* or cavities of the matrices and dies.

Though sometimes they begin with the *creux* or hollowness, but then it is only when the intended work is to be cut very shallow.

The first thing is the designing the figures, the next is the moulding them in white wax, of the size and depth they are to be; and from this wax the punch is engraven.

This punch is a piece of steel, or at least of iron and steel mixt; on which the intended figure, whether a head or a reverse, is cut or chissell'd in relievo, before the metal is temper'd or hardened.

The instruments us'd in this *Graving* in relievo, which are much the same as those wherewith the finishing the work in *creux* is effected, are of steel.

The principal are *Gravers* of divers kinds, chissels, flat-terers, &c.

When the punch is finish'd, they give it a very high temper, that it may the better bear the blows of the hammer with which it is struck, to give the impressiion to the matrice.

That which *Engravers* call *matrice* or *matrix*, is a piece of good steel of a cubical form, call'd also a dye, on which the relievo of the punch is struck in *creux*.

It is call'd *matrix*, because the coins or medals seem to be form'd or generated in the cavities or indentures thereof, as animals are in the *matrix* of their mother.

This steel is made hot to soften it, that it may the more readily take the impressiion of the punch; and after striking the punch on it in this state, they proceed to touch up or finish the strokes and lines, where by reason of their fineness, or the too great relievo they are any thing defective, with some of the tools abovementioned.

The figure being thus finish'd, they proceed to *Engrave* the rest of the medal, as the mouldings of the border, the engrail'd ring, letters, &c.

All which, particularly the letters or engrailment, are perform'd with little steel punches, well temper'd and very sharp. And as they sometimes make use of puncheons to *Engrave* the *creux* of the *matrix*; so on some occasions they make use of the *creux* of the *matrix* to *Engrave* the relievo of the punch.

To examine and judge of the *Engraving* in *creux*, divers methods have been devised to take the impressiions from it, as the work proceeds.

Sometimes they make use of a composition of common wax, turpentine and lamp-black ; which always retaining its softness, easily takes the impression of the part it is apply'd to.

But as this only serves to shew the work by piece-meal, they have recourse to other methods to shew the whole figure.

The first is by pouring melted lead on a piece of paper, and clapping the matrice upon it ; the second is with melted sulphur manag'd the same way ; the third is by laying a piece of soft paper on the *Graving*, and over the paper a leaf of lead ; when giving two or three blows with a hammer on the lead, the paper takes the impression of the work. But this is only proper where the *Engraving* is shallow.

When the *matrix* is quite finish'd, they temper it, rub it well with pumice stone, and clean out the stone again with a hair brush ; and lastly, it is polish'd with oil and emery. In this condition it is fit for the mill, to be us'd to strike coins, medals, &c.

*Engraving* on seals, stamps, puncheons, marking irons for goldsmiths, pewterers, book-binders, &c. either in relievo or indenture, is perform'd after the manner last describ'd.

#### ENGRAVING PRECIOUS STONES *and* CRYSTAL.

As to *Graving* on precious stones and crystal, the invention is very ancient as well for the *concave*, as the *relievo* ; several pieces in both kinds are to be seen, which shews us the wonderful skill of the ancient *sculptors*, both for the *beauty* of the *design* and the excellency of the *work*.

Though they *Engrave* upon almost all sorts of precious stones, yet the most finish'd figures which we meet are upon *onyx's* and *cornelians*, because they found that these were more proper than others, on account of their being more firm, more equal and *Engraving* cleanly, and also on account of the several colours that are in the *onyx's* in rows one above another ; by which means in their *relievo's*, they so ordered it that the ground was of one colour, and the figure of another, as is to be seen in several fine pieces ; which are done with the wheel and *emeril* of powder of diamond, and the tools that will be spoken of hereafter.

As to those that are engrav'd in *concave*, they are the more difficult, because 'tis a sort of work in the dark, and it is necessary to judge aright of what is done to take proofs every moment by impressions in paste or wax.

This art, which was lost with others, did not begin to appear again till the time of Pope *Martin V*, the beginning of the fifteenth century.

One of the first who undertook to *Engrave* on stones was a *Florentine*, call'd *John*, and surnam'd *Deelle Gorgnivoile*, because  
he

he usually work'd on these sort of stones; others came after him, who engrav'd all sorts of precious stones.

In this way was the *Dominican* firnam'd *de Camei* a *Milanese*, who engrav'd the portrait of *Lewis* the *Moor* Duke of *Milan* on a *Ruby*. Others afterwards represented greater figures on fine stones and *crystal*.

To *Engrave* on precious stones or *crystal*, the artificer makes use of the diamond; for the diamond which is the most perfect and hardest of all precious stones, cannot be cut but by itself.

The workman begins by cementing two rough diamonds at the end of two sticks, big enough to be held firm in the hand, and rubs the diamonds one against another, which the *French* call *egrifer*, and thus he gives them what form and figure he desires.

In rubbing the two rough diamonds, there falls off a powder into a kind of box, which is what the jewellers make use of afterwards to polish their diamonds, and they do it by a mill turn'd by an iron wheel; on this wheel is laid an iron pincer, to which answers a shell of *copper*; the diamond is foldered into this shell with tin fodder; and that the pincer may bear the harder on the wheel, a great plate of lead is put upon it.

The wheel on which the diamond is plac'd is sprinkled with the powder that came from it and oil of olives; when the jeweller cuts with *facets* he changes his tools from time to time, according as his work finishes, till it is in its last perfection.

When a diamond is to be sawn into two or more pieces, the workman takes the diamond powder well pounded in a steel-mortar, and a pebble of the same; 'tis alloy'd with water and vinegar or something else, which is thrown on the diamond as it is cut with iron or copper wire as fine as a hair; there are diamonds cut tools made on purpose.

As to *rubies*, *sapphires* and *topazes*, they are cut and sprinkled with powder of diamond and oil of olives, the polishing is done on another copper wheel with *tripoli* tempered in water.

The workman turns a wheel with one hand, and with the other he forms the stone fix'd to a stick, fastened in an instrument of wood, call'd a *quadrant*, because 'tis compos'd of several pieces that quadrate together, and is mov'd by a vice; which turning the stick, forms regularly the different figures the lapidary would make on the stone.

As for *rubies*, *ballais*, *espinelles*, *emeralds*, *jacynths*, *amethysts*, *granates*, *agats*, and other sorts of stones, which are not so hard, they are cut on a leaden wheel, sprinkled with *emeril* dust tempered in water; afterwards they are polish'd on a tin wheel with *tripoli*, in the same manner as abovemention'd.

There are other sorts of stones, as the *turquois*, the *gerasol*, and the *opal*, which are polish'd on a wooden wheel with *tripoli*.

To make and engrave a *vase* or urn of *agate*, *crystal* or hard stones, the lapidary makes use of a machine which they call a *tower*, the same as the pewterers use, excepting that instead of the pewterers being dispos'd to hold the pots and vessels which they work with tools, this is commonly made to hold the different tools that are apply'd to it.

These tools as they turn, form or engrave the vessels that are presented to them to be fashioned and adorned in *relievo* or *deep*, as the workman pleases, who changes his tools according as he has occasion; he also sprinkles powder of diamond and oil of olives, or some other such dust upon his tools.

There are some stones that are hardly worth the diamond powder, and work better with other dust, as the *jacynth*, the *gerasol*, the *turquois*, and several others that seem to be of a fat nature.

When the stones are polish'd, and are to be engraven either in *relievo* or *deep*, if they are in little pieces as medals or seals, the lapidary uses a machine call'd a *little tower*, which is nothing else but an iron wheel, the two ends of whose axis turn and are fastened in two pieces of iron like turners spectacles; which open and shut as one pleases, they being half clove for that purpose, and joining again at the top by a *traverse*, which holds them, or made after any other manner.

At one end of the axis of the wheel are put the tools, which are lock'd and fastened in with a *vice*, and held so by it.

This wheel is turned with the foot, and the hand guides the work against the tool, which is of iron; but if the work be large, it is sometimes of brass; all tools great or small are made of iron or brass; some are like little whirlegigs, and are call'd *saws*; some are term'd *scabbards*, and have a little round head like a button; those that are call'd *hinges*, are made in the form of an iron ring, and serve to lift up the pieces; there are some flat, and other different sorts, which the artificer causes to be forg'd of several sizes, according to the quality of the work.

The tool is apply'd to the stone to be work'd, not directly opposite to the end of the tool, but side-ways; so that the saw takes it off in turning against, and as it were cutting it.

The same way is practis'd in making figures, letters or cyphers, by sprinkling diamond dust and oil of olives; and sometimes when the workman would pierce any thing through, little iron bodkins are fix'd to the tower, at the end of which there is a diamond enchas'd.

When

When the stones are engrav'd in *relievo* or *deep*, they are polish'd on wheels of brushes made of hog's bristles and *tripoli*, on account of the delicacy of the work.

And when there is a large field, copper or tin tools are made on purpose to polish it with *tripoli*, which are apply'd to the little *tower*, after the same manner as graving tools.

### ENGRAVING in RELIEVO or in CONCAVE.

There are several ways of *Engraving* in metals, and upon precious stones, for *relievo's* are made in both the one and the other, as well as *graving* in *concave*.

When an artist would engrave on steel to make medals, he begins with designing his subject, whether an effigy or device, which he cuts out on wax in *bas relief*; then he makes a puncheon, and on one of these ends, which ought to be of case hardened steel, he cuts out of *relief*, the same thing he made in wax.

When the puncheon is in its perfection he tempers it to harden it, and then with a mallet or some such instrument, strikes upon it to make the impresson in a squared piece of steel form'd like a dye; before which, he puts the squar'd piece into the fire to soften it, and make it more easily receive the impresson with the puncheon; for being struck hot and cold, it receives in *concave*, what is in *relievo* on one end of the puncheon.

The squared piece not taking all the delicate strokes of the puncheon, which commonly is us'd for the raising of the *relievo*, there is a great deal more to be done to finish the *concave*; which is perform'd with steel tools, as little chizels, burins, sharp gravers, echops, rissloirs, little chizels with files at the end, and several other tools, some to cut, some to hew, some strait, some crooked, which the artificer provides himself with, and tempers and rubs on a pumice-stone.

As the puncheon is made use of, it is from time to time brush'd with a sort of brass wire.

When the figures are finish'd, he engraves the rest of the medal, as the moulding of the borders, the letters, &c. for which he uses the *tracer*, the *ingraller* and other puncheons, well steel'd and tempered; those that are us'd for the mouldings and letters, are struck and impress'd on the puncheon with a hammer; for neither the *burin* nor the *little chizel* can engrave letters to the same perfection as these puncheons.

There are abundance of other little things necessary to be done in medals, according to the nature of the design, which must be struck also as well as the letters.

As for the little *chizels*, they are to be touch'd lightly with a mallet, more or less as the work requires.

## E T C

*To write or Engrave upon an* EGG, PEBBLE, FLINT, &c.

Write what you please with wax or grease upon an egg, pebble, flint, &c. then put it into the strongest spirit of vinegar or oil of salt, letting it lie two or three days, and you will find every place about the letters or writing, eaten or consum'd away; but the places where the wax or grease was, not touch'd at all.

ENVY is represented by a wonderful lean old man, with a pale and meagre face, in whose withered cheeks age has wrought deep furrows and wrinkles.

EQUALITY is represented in painting by a middle aged woman, holding a pair of scales in her right hand, the nest of a swallow feeding her young ones in her left.

The scales denote justice duly weighing actions, the swallow the father of a family dividing his estate equally amongst his children; imitating the swallow that never takes from one to give to another.

EQUALITY is also represented in painting by a lady, lighting two torches at once.

ERASMUS ROTERODAMUS is painted yellow haired, grey eyed, and somewhat pale.

ERATO. Takes her name from *Eros*, love or desire, she is one of the nine muses, and is painted with a sweet and comely countenance, her temples encompass'd with myrtles and roses; bearing an heart with an iron key, by her side *Cupid* winged with a lighted torch; having his bow and quiver at his back.

ERROR is represented in painting, by a man in a pilgrim's habit groping out his way blind-fold.

The cloth blinding him signifies man's falling into *Error*, when his mind is darkned with worldly concerns; the staff his being apt to stumble, if he take not the guide of the spirit and of right reason.

ESTEEM cannot be represented in drawing, &c. but by ATTENTION, and by the motion of the parts of the face, which seem fix'd upon the object causing this attention; for then the eye-brows will appear advanc'd forward over the eyes, being depress'd next the nose, and the other ends a little rising, the eye very open, and the eye-ball turn'd upwards.

The veins and muscles of the front, and about the eyes will appear a little swell'd, the nostrils drawing downwards; the cheeks will be moderately sunk in about the jaws, the mouth a little open, the corners drawing back, and hanging downwards.

ETCHING is a method of engraving on copper, in which the lines or strokes, instead of being cut with a tool or graver, are eaten in with *aqua fortis*.



## E T C

The invention of *Etching*, properly so call'd, was much about the same time as engraving on copper, by *Albert Durer* and *Lucas*.

*Etching* has several advantages over *graving*; as first that it is done with more ease and expedition; secondly, that it requires fewer instruments; and thirdly, that it represents divers kinds of subjects better and more agreeably to nature, as landscapes, ruins, grounds, and small, faint, loose, remote objects, buildings, &c.

The method of *Etching* is as follows; the copper plate being prepar'd, well hammer'd and polish'd as for engraving, then scrape some chalk, and with a clean linen rag rub it well over the plate, to free it from grease; heat it over the fire, and when hot, cover it over with a peculiar ground or varnish.

When this ground or varnish is laid on, it is blackened with the smoke of a candle; and on this varnish or ground, thus blackened, the back of the design or draught is laid, being first rubb'd over with red-chalk.

This design being laid on, is to be calk'd or transferr'd upon the varnish'd side of the plate; this is done by tracing over all the lines and strokes of the draught, with a needle or point not very sharp, which pressing the paper close down to the ground, causes the wax to lay hold of the red-chalk, and so brings off with it the marks of the several lines; so that at length it shews a copy of the whole design in all its correctness.

The draught or design being thus calk'd, the etcher next proceeds to draw the several lines and contours with a pointed tool, through the grounds upon the copper.

In doing this, he makes use of points of divers sizes, and presses on them more strongly or lightly, according as the several parts of the figures, &c. require more or less strength or boldness.

Some of these points are as fine as needles, for the tender hair strokes, and the remoter fainter objects; and others again as big as bodkins, made oval-wise, for the deeper shadows, and the figures in the front of the work.

This being done, a rim or border of wax is rais'd round the circumference of the plate to keep in the *aqua fortis*, which is to prevent the *aqua fortis*, from running off at the edges; and then it is poured on the plate so prepared.

The ground or varnish with which the plate is covered being impenetrable by the corrosive quality of the *aqua fortis*, defends the plate from it every where, but in those lines or hatches, cut thro' it with the points; which lying open, the water passes thro' them into the copper, and eats into it the depth requir'd; which being done, it is pour'd off again.

## E T C

It is to be observ'd, there are two kinds of *Etching* grounds, the one soft and the other hard.

There are likewise two kinds of *aqua fortis*, the one white, which is only us'd with the soft ground, and is apply'd as has been before directed; and the other green made of vinegar, common salt, *sal ammoniac* and verdegrease.

This is us'd indifferently with either kind of ground.

The application of the *green* is somewhat different from the white.

This is poured on the plate without any border, which also is plac'd a little inclin'd to the end, that the water may run off, which is receiv'd in a vessel, plac'd underneath.

This pouring on of the *aqua fortis* is several times repeated, till it has eaten deep enough.

Nor must the *aqua fortis*, of which kind soever it is, continue equally long, or be poured on equally often on all the parts of the design, the remote parts must be eaten more slightly than those nearer to the view.

For effecting this, they make use of a composition of oil and grease, with which they cover the parts, that are to be bitten no farther.

Or else they lay this composition on as a defensative at first, and take it off again, when they find it proper.

In a word, they are every now and then covering or uncovering one or another part of the design, as occasion requires.

The management of the *aqua fortis* is the principal thing in the whole art of *Etching*, and that on which the effect of the whole very much depends.

The workman must be very observant as to the ground, that it don't fail or give way in any part to the *aqua fortis*, and if it does in any place to stop up that place with common varnish.

This must also be observ'd, that a fresh dip of *aqua fortis* must never be given, without first washing out the plate in fair water, and drying it at the fire.

When the *aqua fortis* has perform'd its part, the ground must be taken off, and the plate wash'd and dry'd; after which the artist must examine it, with his graver in his hand, to touch it up and heighten it, where the *aqua fortis*, &c. has miss'd.

ETCHING. *The materials used therein.*

*Etching* is an artificial engraving on copper or brass plates with *aqua fortis*.

The instruments used in *Etching* are thirteen:

1. *Hard varnish.*
2. *Soft varnish.*
3. *Prepar'd oil.*
4. *Aqua fortis.*
5. *Needles.*
6. *Oil stone.*
7. *Brush pencils.*
8. *Burnisher.*
9. *A scraper.*
10. *Compasses.*
11. *Ruler.*
12. *A Stift.*
13. *The frame and trough.*

*Etching*

## E T C

### *Etching needles.*

Chuse needles of several sizes, such as will break without bending, and of a fine grain; then take good round sticks of firm wood (that is not apt to split) in length about six inches, and about the thickness of a large goose quill, at the end of which fix your needles, so that they may stand out of the sticks about a quarter of an inch, or something better. Of these needles you ought to have twenty at least; which you may also fix in such sticks as to have a pencil at the other end.

### *How to whet the points of the needles with the oil stone.*

If you would whet them round, the points must be whetted short upon the oil-stone (not as sowing needles are) turning them round as you whet them, as turners do. If you would have them sloping, first make them blunt upon the oil-stone; then holding them firm and steady, whet them sloping on one side only till they come to a short and roundish oval.

*The brush pencil* is to cleanse the work, wipe off dust, and to strike the colours even over the ground or varnish, when laid upon the plate.

*The burnisher* is a well hardened piece of steel, somewhat roundish at the end. Its uses have been mentioned before.

*The scraper* is one of the instruments fitted for clearing the plate of all deep scratches or strokes which the burnisher will not take away; they are first to be scrap'd out with the scraper (carrying an even hand, that you may not make more work) and afterwards what has been scrap'd is to be burnished.

*The compasses.* Their chief use is in measuring distances, or striking circles, or some part or portion of them, where you would have your work to be exact.

*The ruler* is used chiefly in drawing all the strait hatches or lines of the design upon the plate, or to mark out distances upon strait lines.

*The stift* is used for drawing through all the out-most lines or circumferences of the print, pattern, or drawing, which is etched after.

### *To make the frame.*

The frame is an entire board, about the top and sides of which is fastened a ledge about two inches broad, to keep the *aqua fortis* from running off from the sides when it is poured on; the lower end of this board is to be plac'd in the trough, leaning sloping against a wall or some other thing, in which are to be plac'd six several pegs of wood to rest the plate upon.

*The Trough* is made of a fine, firm piece of elm or oak, set upon four legs, the hollow of which is in width four inches, and of such length as may be fit for use.

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The hollow must be something deeper in the middle that the water running thither may fall thro' a hole (made there for that purpose) into an earthen pan well leaded.

The inside of this board and trough must be covered with a thick oil colour, to hinder the *aqua fortis* from eating or rotting the board.

### *The polishing of the plate.*

Besides what has been said of polishing the copper plate for engraving (see ENGRAVING) take the directions following.

1. The plate being well planish'd or forg'd, chuse the smoothest side for polishing; then fix it upon a board a little declining, and rub it firmly and evenly all over with a piece of grindstone, often throwing water upon it, so long till there remain no dints or flaws or marks of the hammer.

2. Wash it clean, and with a piece of good pumice-stone, rub it cross-wise to the former, till the marks of the grind-stone are rubb'd out.

3. Then wash it clean again, and rub it with a fine hone and water cross-wise to the former, till the marks of the pumice-stone are rubb'd out.

4. Wash it again, and with a piece of charcoal without knots (being heated red hot, and quenched in urine, the outside having been pared off) rub the plate with water, till all the small strokes of the hone disappear.

5. If there shall yet remain any small strokes or scratches, rub them out with the end of the burnishing iron; but if they happen to be pretty deep, then you must make use of your scraper to scrape them out, and afterwards burnish them, and lastly, charcoal them as before directed, till the plate is glaz'd, and then it is finished.

### *To make the hard varnish for ETCHING.*

Take *Burgundy* or *Greek* pitch ten ounces, of *colophony* or rosin the same quantity, of *nut oil* eight ounces; melt the pitch or rosin in an earthen pot over a gentle fire; then put in the oil, and let them boil for the space of half an hour; then set it on a more slow fire, and let it cool a little, till it appear like a glewy fyrup; then cool it a little more, and strain it, and when it is almost cold, put it into a glaz'd pot for use. This will keep good for seven years and more.

### *To make the soft varnish for ETCHING.*

Take of *virgin's wax* six ounces, *mastick* in drops four ounces, *asphaltum* two ounces; grind the *mastick* and *asphaltum* separately very fine, and sift them thro' a fine hair sieve; then melt the wax in an earthen pot, and strew in the *mastick* and *asphaltum*, keeping stirring upon the fire, till they be well dissolv'd and mixt, which will be in about half an hour; then let it cool a little, and

pour

## E T C

pour into a bason of fair wuter (but do not let the dregs go in ; and having wetted your hands, take it out of the water, and make it up into rolls before it is cold.

*Or thus ;* Take of *virgin's wax* eight ounces, *asphaltum* four ounces ; *amber* and *masstick* of each two ounces ; reduce the three last into a fine powder ; mix them over a gentle fire, so that it may not be burnt ; then take it off the fire, pour it into a vessel of fair water, and make it up into rolls or balls. and keep it from the dust ; when you have occasion to use it, take a quantity of it, and tie it up in a piece of taffety or silk, and use it according as you will be directed hereafter.

*Or thus ;* If it be for a *red* ground, take red-lead, grind it very well, and temper it with varnish.

*Or thus ;* For another *red* ground, take *red-lead* or *vermilion*, and having ground it very well, grind it again with linseed oil, and lay it on very thin.

*Or thus ;* Take *virgin's wax* two ounces, *asphaltum*, *amber*, and *masstick*, of each one ounce (but if the weather be cold, but half an ounce of *masstick*) rosin and shoemakers pitch of each half an ounce, common varnish a quarter of an ounce ; melt the wax in an earthen vessel ; then put in the other ingredients by degrees ; mix them well, and make it up into rolls or balls, and keep it from dust for use.

*Or thus ;* For a *white* ground, take rosin four ounces, *wax* two ounces ; melt them together, adding *Venetian cerus* finely ground four drams.

*Or thus ;* For a *black* ground, take *asphaltum* two ounces, *bees wax* one ounce, melt them together, and while they are warm, lay it thinly on with a lawn rag.

### *To make the prepar'd oil.*

Heat *oil olive* in an earthen vessel, and put into it a sufficient quantity of *sheeps suet* tried (so much that it being dropt upon a cold thing, the matter will be a little hardened and firm) let them boil together for the space of an hour, till they become of a reddish colour, lest they should separate when they come to be used.

This mixture is to render the fat more liquid, and prevent it from cooling too fast ; for the fat alone would be no sooner on the pencil, but it would grow cold. You must likewise remember not to fail in putting more oil in winter than in summer.

### *To make aqua fortis.*

Take of distill'd white wine vinegar one quart, of *sal armoniack* and bay salt of each four ounces, of *verdegrease* almost three ounces ; put all these together into a pretty large earthen vessel well glaz'd ; cover the pot close ; set it over a quick fire (taking care that they do not boil over) give it as speedily as you can

## E T C

can two or three great walms, and no more, when it is ready to boil, uncover the pot, and stir it now and then with a bit of stick; but take care that it does not boil over; when it has boil'd take it off, and set it by to cool, keeping it still close covered; and when it is cold, put it into a glass bottle with a glass stopple.

If it proves too strong in *Etching*, you may weaken it with a glass or two of the same vinegar you made it of.

*The method of using the hard varnish.*

1. Heat the plate (being polished over a chafing dish of coals) and with a little stick take some of the first varnish, and put a drop of it on the top of your finger, and with it touch the plate lightly at equal distances, laying on the varnish equally, and heating the plate again as it grows cold, preserving it carefully from getting any dust or filth; then with the ball of your thumb, dab it upon the plate, still wiping your hand over all, you make it more smooth and equal.

*And in this great care must be taken that the varnish be not too thick upon the plate, nor your hand sweaty.*

2. When you have done this, take a great lighted candle that burns clear, with a short snuff (placing the corner of the plate against a wall) and holding the varnish'd side of the plate downwards over the candle, as close as you can, (not to touch the varnish) guide the flame all over the plate, till it is all perfectly black'd; let it not get any dust nor filth till it is dry.

3. Hang the varnish'd plate to dry over a charcoal fire with the varnish'd side upwards, which will smoak; when the smoak abates, take away the plate, and with a pointed stick, scratch the near side of it; and if the varnish comes easily off, hang it over the fire again for a little while, till the varnish will not come off too easily; then take it from the fire, and set it by to cool.

*If the varnish should be too hard, cast cold water on the back-side of the plate to cool it, that the heat may not make it too hard and brittle.*

In the next place, place it on a low desk, or some such like thing, and cover that part which you do not work on with a sheet of fine white paper, and a sheet of brown paper over that, on which you may rest your hand to keep it from the varnish.

If you make use of a ruler, lay some part of it upon the paper, that it may not rub off the varnish; and take an especial care, that no dust or filth get in between the paper and the varnish, for that will hurt it.

*The method of ETCHING.*

1. In making lines or hatches, some bigger, and some lesser, strait or crooked, you must use several sorts of needles, bigger or lesser, as the work requires.

2. The

## E T C

2. The large lines are made by leaning hard on the needle, the point being short and thick (but a round point will not cut the varnish clear) or by making divers lines or hatches one very close to another, and then by passing over them again with a thicker needle; or by making them with an indifferent large needle, and letting the *aqua fortis* lie the longer thereon.

The best needles for this work are those that are whetted sloping with an oval, because their sides will cut that which the round ones will not.

3. If your lines or hatches ought to be of an equal thickness from end to end, lean on the needle with an equal force; leaning lightly where you would have the lines or strokes fine or small, and heavier where you would have the lines appear deep or large, whereby the needle may have some impression on the copper.

4. If the lines or hatches are too small, pass over them again with a short round point of such a bigness as you would have the line of, leaning strongly where you would have the line deep.

5. The manner of holding the needle with oval points (which are most proper to make large and deep strokes) much resembles that of a pen, only the flat side whetted is usually held towards the thumb; but they may be used with the face of the oval turned towards the side of the little finger.

6. If you would end with a fine stroke, you ought to do that with a very fine needle.

7. In using the oval points hold them as upright and strait in your hand as you can, striking your strokes firmly and freely, for that will add much to their beauty and clearness.

8. In landscapes in places farthest off from the sight, as also nearest the light, use a very slender point, leaning so lightly with your hand, as to make a small faint stroke.

9. Be careful while you are working to brush off all the dust which you work off with the needles.

10. But this you must take notice of, that you ought to be able to copy any drawing or print exactly, and to draw after good heads of plaister or figures, according to your own fancy, and skilful in shadowing every thing exactly according to art: and therefore, when you imitate plaister, be sure to take the true out-lines or circumferences, and taking notice how the shadow falls, to do it very faint and soft as the design requires.

11. Therefore it is convenient that you be able to hatch with the pen, exactly after good prints or copies, and when you can perfectly do that, and draw after plaister, then to imitate the life; but before you draw after the life, you must be very exact and true in your out-lines or circumferences.

12. Now



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12. Now to take the outmost lines in any drawing or print upon the ground of the plate, you must scrape a little white-lead upon the back-side; then take a feather, and rub it over every where alike, and shake off that which remains loose.

Having done this, lay the print on the plate, on that side the lead is, and fasten the four corners of it to the plate with a little soft wax; then take the *stift*, and draw upon the print all the outmost lines or circumferences exactly; when you have done this, take off the print from the plate, and all the same out-lines and circumferences, which you drew upon the print with the *stift*, will be exactly found upon the ground.

13. Then you must observe very exactly how your original or pattern is shadowed, and how close the hatches are joined; how they are laid, and which way the light falls or comes in; and be sure that you make the light fall one way; if the light falls sideways in the print, you must hatch the other side darkest, which is farthest from the light, and so place the lights altogether on one side, and not confusedly, part on one side, and part on another.

14. Take notice how close all the hatches join, how they incline, and which way they twist and wind, which follow as exactly as you possibly can; but before you begin to hatch or shadow, you must not fail to draw all the out-lines with a needle upon the ground as artificially as you can, which shadow with your needles of several sorts, according to the original.

15. When you are to make a broad stroke, then break off the point of your needle, and whet it upon the oil stone four square till it comes to a point; if fine strokes are to be hatched, then fine pointed needles must be used; if middle siz'd strokes, then you must break off the point of a middle siz'd needle, and whet it as directed before, and the same is to be done in all the sizes; but some artists in making a bold or broad stroke, first of all hatch it fine, and afterwards make it broader by degrees.

### *The method of* ETCHING LANDSCAPES.

1. Hatch that which is nearest to the eye darkest, and make it loose or decline its shadows by degrees, making that faintest which is farthest off.

2. The same method is to be observ'd in *Etching* a sky, for that which is nearest to the eye must be shadowed darkest; but in general as faint and soft as may be, losing itself gradually, as before directed; and by how much the nearer the sky comes to the ground, by so much more loose and faint must it be; and when they both meet as it were together, the sky must be quite lost.

3. When the work has been hatched as exactly as you possibly can with the needles in imitation of the drawing or print;

compare

## E T C

compare them well together, and if you find any thing omitted, supply it; if amiss, amend it.

4. In *Etching* a piece of *perspective*, after either a drawing or a print, before you shadow that which is nearest to the eye the perfectest and strongest; and that which is farther from it must decline in length, breadth and height, according to art and proportion, letting the shadows loose and grow fainter and fainter gradually, till they are in a manner lost.

### *Of Etching or engraving letters.*

1. Screw the copper plate (after it has been made fit for *Etching*) to a hand vice, which hold over a charcoal fire till it be warm; then rub a piece of virgin wax all over the plate, covering it all over very evenly.

2. Then with a stiff duck's wing feather (not ruffled) stroke it over the wax, laying it even and smooth in all parts alike, and let it cool.

3. Then the letters or writing being written on paper with ungummed ink made with vermilion, lay the written side downwards upon the waxed plate, and fasten the four corners with a little soft wax, placing the writing so exactly, that the lines may run strait.

4. Then rub the backside of the paper all over with a dog's tooth, taking care not to miss any part; then pull the paper off the plate, and you will find all the letters written on the paper left exactly upon the wax.

5. Then draw all the letters through the wax on the plate with a stiff, and afterwards cleanse the work from the loose wax, that you have rais'd by so drawing it, with a linen rag or pencil brush, and thus will all the letters be drawn on the copper plate.

6. Then pour upon the plate good *aqua fortis*, and it will be *Etched*; but if you take off all the wax and engrave it, the letters will be much more exact and fine, especially if your gravers be well ground and sharp towards the points; and then whetted smooth upon a good oil-stone, and the graving be well performed; for *Etching* will not perform writing so neatly as engraving.

### *The method of using AQUA FORTIS.*

1. If there are any strokes into which you would have the *aqua fortis* to eat, or any places where the varnish has been rubb'd off, melt a little of the prepar'd oil (before mentioned) and cover those places pretty thick with a pencil.

2. Then dip a brush pencil or rag into the prepared oil, and rub the backside of the plate all over, that the *aqua fortis* may not hurt it, if any should happen to fall on it.

3. Warm

3. Warm the plate gently, or dry it by a fire to dry up all the humidity, which it may possibly have contracted by reason of the air, before you put your *aqua fortis* upon it; and to prevent the varnish from breaking up upon the first pouring on the *aqua fortis*.

4. Place the plate in the trough (as before directed) and having the *aqua fortis* in a pot, pour it upon the plate, beginning at the top, so moving your hand that it may run all over the plate; do this eight or ten times; then turn the plate corner-wise, and pour the *aqua fortis* on it that way ten or twelve times; after this, turn it again corner-wise the other way, pouring on the *aqua fortis* eight or ten times as before, doing thus several times for the space of eight or ten minutes or more, according as the *aqua fortis* is in strength.

For there must be less time allowed to hard and brittle copper, for pouring on the *aqua fortis*; but more to the soft.

5. Great nicety and care must be used in pouring on the *aqua fortis*, as occasion shall require, and as the work shall be, casting it on at several times and on several places; often where you would have it very deep, and fewer where less deep; and less yet where light, and lesser yet where lighter; and those places that are so light as it can scarcely be seen once or twice. Wash it with water, and cover it where you would have it lighter.

6. Having thus covered the plates as occasion requires for the second time, place the plate on the frame as aforesaid, and pour your *aqua fortis* on it for full half an hour.

7. Then wash it with water, and dry it, covering the places which require lightness or faintness (that they may be proportionable to the design) then pour on the *aqua fortis* for the last time, more or less, according to the nature of your work, and the deepness that it requires.

8. You may rub off the varnish or ground, as occasion in your work requires with a charcoal, to see whether the *aqua fortis* has eaten deep enough, by which you may judge of the space of time that you are afterwards to employ in pouring on the *aqua fortis*, in the works you will have to do; which if the shadows require much depth, or ought to be very black, the *aqua fortis* ought to be poured on (at the least time) for an hour or better; yet you must remember, that no certain space of time can be fixt or limited for this.

*The method of finishing the work.*

1. All the former operations being perform'd, wash the plate with fair water, and set it wet upon the fire till the mixture be well melted, and then wipe it very clean on both sides with a linen cloth, till it is thoroughly cleans'd of all the mixture.

2. Take

2. Take charcoal of willow, take off the rind, put fair water on the plate, and rub it with the charcoal as if you were to polish it, and it will take off the varnish.

But you must take care that the coal be free from all knots and roughness, and that no sand or filth fall upon the plate.

3. Add two third parts of fair water to one third part of common *aqua fortis*, and dipping some linen rag in it, rub the plate all over, and this will take away the discoloration of it, and recover its former beauty.

4. Then wipe the plate with dry linen rags so as to take off the aforesaid water, and holding it a little before the fire, put on a little olive oil, and with the furr of an old beaver roll'd up, rub the plate all over, and in the last place wipe the plate well with a dry cloth.

5. Then if any places need touching with the graver, as it frequently happens, especially where it is to be very deep or black, carefully perfect them, and then the plate is fit to be carried to the rolling press.

*The manner of using the soft varnish.*

1. Having made the plate ready by clearing it with a charcoal and fair water, wash it well and dry it, and then rub it well over with fine white chalk scraped and a fine rag, not touching it with your fingers.

2. Lay the plate over a chafing dish of small-coal, yet so that the fire may have air; then having tied up some of the soft varnish in a fine rag, rub it up and down the copper plate, so that it melting in a smear or cover (neither too thin nor too thick) then make it as smooth as possibly you can all one way with a stiff duck's feather, and then crosswise, till it lies smooth and even.

But care must be taken that the plate be not too hot, for if it lies till the ground smoaks, the moisture will be dried up, and that will cause the ground to break or fly up and spoil the work.

3. Then having ready some cerufs or white lead ground with gum water, so that it is of a convenient thickness for spreading on the copper; strike the plate with it cross over twice or thrice till it is smooth with a large pencil or small brush, and then gently smooth the white with a larger brush (made of squirrels tails) and afterwards set it by till it is dry.

4. Or, if you please, you may black the varnish with a candle (as before directed) and then, if it be cold, warm it over the fire, till the varnish begins to melt, that the smoke may melt into the ground, so that it will not rub off with your hand.

## E T C

*The method of ETCHING upon soft varnish.*

1. This way of *Etching* is the same as that of the hard varnish, but you must take great care not to hurt the varnish. This may be done by placing two little boards on the sides of the plate, and laying another thin one cross over them, but so as not to touch the plate. This will serve to rest your hand while you are working.

2. Then lay the plate on a desk (if you please) for by that means the superfluous matter may fall away of it self.

3. But if the design you have to transfer on the plate is any copy or print, scrape some *red-chalk* all over the backside of it, and upon that scrape some soft *charcoal*, till it mingle with the chalk, and rub it all over till it be fine and even with a large stiff pencil; and then lay it upon the plate, and draw over the out-strokes with a blunt needle.

*And as you work, you need not scratch hard into the copper; but only so that you may see the needle go thro' the varnish to the copper.*

4. Be sure whenever you leave your work, to take care to wrap the plate up in a paper, to keep it from hurt, and from being injured by the air, which will dry the varnish; and in winter time, wrap it up in a piece of woollen as well as paper; for if the frost get to it, it will cause the varnish to rise from the copper in the eating in.

*There will also one inconvenience attend the letting the varnish lie too long upon the plate before the work is finished; for the space of three or four months will consume the moisture, and so spoil all.*

5. It will be best to mark the design upon the soft varnish with black-lead or chalk, if the ground is white; but with *red-chalk*, if the ground be black.

6. The design being trac'd on the varnish, cast a little fair warm water upon the varnish'd plate, and then rub upon the white lead, to moisten it all over with a soft clean sponge; and afterwards wash the plate to take away the whiting, and dry it.

7. In the last place, wash it all over with *aqua fortis* mix'd with fair water, and this will take away the whiting, which then wash with common water and dry it; and thus will the plate be prepar'd for *aqua fortis*.

*The manner of using the aqua fortis and finishing the work.*

1. Put soft wax (red or green) round the brims of the plate (being first drawn into a long roll or string) and raise it above the varnish the length of half a barley corn's length; so that placing the plate level, the water being pour'd upon the plate, may be retain'd.

But

## E T C

But that you may be sure that the *aqua fortis* shall not run out, heat a knife in the fire, and sear the wax round about under the plate very close; and be sure you fasten the wax as near to the edges of the plate as you can conveniently.

2. Mix six ounces of single or common varnish with two ounces of common water, and pour it gently upon the plate, so that it may cover it fully and all over; and so will the fuller hatchings be full of bubbles, while the fainter will appear white, not making any sudden operations to the view.

You must take notice of this, *That in order to weaken the aqua fortis, you may mix it with vinegar or a little of that aqua fortis, which has been us'd before; or if the liquor be too strong, it will make the work very hard, and sometimes make the ground to break up; the deeper the aqua fortis lies the harder it will eat.*

3. When you have perceiv'd the water has operated a little while, pour it off into a glaz'd earthen vessel, to be kept to be us'd with some other, and throw fair water on the plate to wash away the *aqua fortis*, and afterwards dry the plate.

4. Where you would have the cut to be faint, tender or sweet, cover those places with prepared oil, and then cover the plate again with *aqua fortis* as before, leaving it on for eight or ten minutes, or longer; then pour off the *aqua fortis* as before, and wash and dry the plate, covering with the prepar'd oil such other places, which you would not have so deep as the rest.

5. In the last place, put on the *aqua fortis* again, and let it lie on for the space of half an hour (more or less) and then pour it off, and wash the plate with fair water as before.

6. *As you would have your lines or strokes to be deeper and deeper, so cover the sweeter or fainter parts dy degrees with the prepar'd oil, that the aqua fortis may lie the longer on the deepest strokes.*

7. Then take off the border of wax, and heat the plate so that the oil and varnish may be thoroughly melted; then wipe them clean off with a linen cloth, and afterwards rub the plate over with oil of olives, and a roller made up of a piece of old beaver hat; and if there be need, touch it up with the graver.

8. But if, at last, you shall have forgotten any thing, then rub the plate well with crums of bread, that no filth or oil may remain upon it.

9. Then heat the plate over a charcoal fire, and spread the soft varnish upon it with a feather (as before) so that the hatchings may be fill'd with varnish; black it, and then touch it over again, or add what you intend.

10. Make your hatchings with such needles as the work requires, taking care to cover the first graving on the plate with  
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prepar'd

prepar'd oil, before you lay on the *aqua fortis* (lest the varnish should not have covered all over) then let the *aqua fortis* eat into the work, and when it has so done, cleanse the plate as before.

11. When you have cleansed the plate, if you perceive that the *aqua fortis* has not eaten deep enough in some places, you must mend those defects with the graver.

12. That you may know whether the *aqua fortis* has eaten deep enough, after it has lain a quarter of an hour, pour it off from the plate into a glass, and wash it with a little fair water, and scrape off a little bit of the ground with a knife, where it is hatcht, and may be least prejudicial to the work; and if you find it has not eaten deep enough, cover the bare place of the plate with prepar'd oil, and put on *aqua fortis* again, letting it lie till you think it deep enough.

13. Or you may mix it with some new *aqua fortis*, if you think what you have already used be too weak; and you will at length arrive at a certainty by many trials and practice.

14. Or you may make a trial upon a waste piece of *copper* rudely hatch'd, pouring the *aqua fortis* both upon the plate, and that at one and the same time; and after a sufficient season, take off a little piece of the ground with a knife, from the waste piece of copper, where it is hatch'd; and if it be not deep enough, cover it again with the prepared oil, and make a new trial, and after this manner proceed till you find the *aqua fortis* has eaten deep enough.

15. Wash the plate with a little fair water before you warm it, for otherwise the *aqua fortis* will stain the place.

16. If the ground has been broken up in any place, pour the *aqua fortis* off the plate, wash it with fair water, and cover it with prepar'd oil, and then pour on the *aqua fortis* again, and it will preserve the plate from injury.

17. That you may make the *aqua fortis* work harder or softer, you must cover those places of the plate which you would have to be faint (after the *aqua fortis* has been once pour'd off the plate) with the prepar'd oil, which oil must be us'd by degrees, as you would have the work fainter.

This will be found necessary in *Etching* landscapes, because they must gradually lose and stand at a distance.

ETERNITY is represented in painting in the form of a fair lady, having three heads, signifying the time past, present, and to come; she holds in her left hand a circle, pointing with the fore-finger of her right hand up to heaven. The circle shews, that *Eternity* hath neither beginning nor end.



## E U R

In the medals of *Trajan*, *Eternity* was figured red, sitting upon a sphere, with the sun in one hand, and the moon in the other. By her sitting posture is signified perpetual constancy.

In the medals of *Faustina*, she was drawn with a veil, and in her right hand the globe of the world.

*Claudius* describes *Eternity* by a serpent, encompassing round with his body the cave or den wherein it lieth; so that making a circle, it holds in its mouth the end of its tail, which with the *Egyptians* was the emblem of the year.

ETHICKS is represented in painting by a lady of a sober, grave aspect, holding the instrument *archipendulum* in one hand, with the other a lion bridled.

The lion demonstrates that moral philosophy subdues and curbs the passions, teaches to observe a medium between virtue and vice; the instrument shews the just equilibrium, not to transgress to either of the extremes.

E. V. Stands for *Eneas Vighi* of *Parma*, who engraved the works of *Rossi*, *Titian*, *Buonaroti*, *Julio Clovio*, and of *Baccio Bandinelli*.

E. V. H. Stands for *Esacab Van Hulsen*.

EVENING is represented in painting by a babe, still winged, of a dusky carnation colour, in a posture of flying towards the west; a bright star on his head; in his right hand an arrow, in his left a bat.

His flying shews it to be the *Evening* twilight; the star is *Hesperus*; the arrow signifies the vapours attracted by the sun, which having nothing to sustain them, fall down, and are more or less noxious, according to the places high or low.

EUROPE is represented in painting by a lady in a very rich habit of several colours, sitting between two crosses *Cornucopia's*, the one full of all sorts of grain, and the other of black and white grapes; holding a temple in her right hand, and with the fore finger of the left hand points at scepters and crowns; a horse amongst trophies of arms; a book also with an owl on it; many musical instruments by her, and a pallet for a limner with pencils.

All which shews it to be the principal part of the world for religion, arts, and arms.

EURUS. The east wind is represented in painting by a youth with puff'd and blown cheeks (as all the other winds must be) having wings on his shoulders, his body like a tawney-more; upon his head a red sun.

EURYTHMY in painting and sculpture; a certain majesty, elegance and easiness appearing in the composition of divers members, or parts of a Body or painting, and resulting from the fine proportions thereof.

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**EUTERPE**, so call'd for giving delight, and is repreiented crowned with a garland of flowers, holding in each hand sundry wind instruments.

**EXERCISE** is represented in painting by a man in his juvenile years, cloathed in a short garment of divers colours; his arms naked, a clock on his head, a golden circle in one hand, in the other a scroul inscribed **ENCYCLOPÆDEIA**. He has winged feet; at his right side are several sorts of arms, at his left divers instruments of agriculture.

His youth denotes his being able to sustain the fatigues of Exercise; his naked arms his being in a readiness; *Encyclopædia* signifies the circle of all sciences, which are attained by Exercise, as well as skill in arms; the clock denotes Exercise by divers motions of the wheels that distinguish the time and hour.

**EXPRESSION**, says *Monf. Le Brun*, is a lively and natural resemblance of the things which we have to represent. It is a necessary ingredient in all the parts of painting, and without it no picture can be perfect; it is that which describes the true characters of things. It is by that the different natures of bodies are distinguished, that the figures seem to have motion, and that every thing therein counterfeited appears to be real.

It is as well in the *colouring*, as in the design; it ought also to be observ'd in the representation of landscapes, and in the composition of the figures.

*Expression* is also a part, which marks the motions of the soul, and renders visible the effects of passion.

**EXPRESSION** in painting is a term us'd to signify the natural and lively representation of the subject of the several objects intended to be shewn.

The *Expression* consists principally in representing the human body and all its parts in the action suitable to it; in exhibiting in the face the several passions proper to the figures, and observing the motions they express on the external parts. See **ATTITUDE**.

The term *Expression* is frequently confounded with that of *passion*; but there is a difference betwixt them, which is this: that *Expression* is a general term, which implies a representation of an object, agreeably to its nature and character, and the use or office it is to have in the work; and *passion* in painting is a motion of the body, accompanied with certain dispositions or airs of the face which mark an agitation in the soul; so that every *passion* is an *Expression*; but every *Expression* is not a passion.

*The laws or rules of Expression in painting.*

*Expression* being, as has been said, a representation of things according to their character, may be considered either with respect

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respect to the *subject* in general, or to the *passions* peculiar thereto.

I. With respect to the *subject*, it is to be observ'd.

1. That all the parts of the composition are to be transform'd or reduced to the character of the subject, so as they may conspire to impress the same sentiment, passion or idea: thus *e gr.* in a representation of joy and peace, every thing should appear calm and agreeable; of war, turbulent, and full of terror, &c.

2. In order to this, if any circumstance occurs in history or description, that would invert or take from the idea, it must be suppress'd, unless essential to the subject.

3. To this end, the history or fable is to be well studied in the authors who describe it, in order to conceive its nature and character truly, and impress it strongly on the imagination, that it may be diffus'd and carried through all the parts of the subject.

4. A liberty may be taken to chuse favourable incidents in order to diversify the *Expression*, provided they are not contrary to the principal image of the subject, or the truth of history.

5. The harmony of the *tout ensemble* ought to be particularly regarded, both with regard to the actions, and the light and colour. See CLAIR OBSCURO.

6. The modes and customs are to be observ'd, and every thing made conformable to time, place and quality.

7. The three unities of time, place and action ought to be observ'd, that is, nothing should be represented in the same picture, but what is transacted, or passes at the same time, and may be seen at the same view.

II. With respect to the particular *passions* and *affections* of the subject, the rules are,

1. That the passions of brutes be few and simple, and have almost all an immediate respect, either of self-preservation or the propagation of the kind; but in human kind there is a greater variety. Hence a man can move his eye brows, which are immoveable in brutes; and also can move the pupil of his eye every way, which brutes cannot.

2. *Children*, who not having the use of reason, act much after the same manner as brutes, and express the motions of their *passions* directly, and without fear or disguise.

3. Tho' the *passions* of the soul may be *expressed* by the actions of the body, 'tis in the face they are principally shewn, and particularly in the turn of the eye and motions of the eye-brows.

4. There are two ways of lifting up the eye-brows, the one at the middle, which likewise draws up the corners of the mouth,

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and argues pleasant motions; the other at the point next the nose, which draws up the middle of the mouth, and is the effect of grief and sadness.

5. The passions are all reducible to joy and sadness, either of which is either simple, or mixt, and passionate.

6. Joy causes a dilatation of all the parts; the eye-brows rise in the middle, the eyes half open and smiling, the pupil sparkling and moist, the nostrils a little open, the cheeks full, the corners of the mouth drawn a little upwards, the lips red, the complexion lively, the forehead serene.

7. Passionate joy proceeding from love, shews the forehead smooth and even, the eye-brows a little elevated on the side the pupil is turn'd to, the eyes sparkling and open, the head inclin'd towards the object, the air of the face smiling, and the complexion ruddy.

That proceeding from desire shews it self by the body, the arms extending towards the object in uncertain and unquiet motions.

8. *Simple sadness* is express'd by the body being cast down, the head carelessly hanging aside, the forehead wrinkled, the eye-brows rais'd to the midst of the forehead, the eyes half shut, the mouth a little open, the corners downwards, the under-lip pointing and drawn back, the nostrils swell'd and drawn downwards.

That mixt with fear causes the parts to contract and palpitate, the members to tremble and fold up, the visage to be pale and livid, the point of the nostrils elevated, the pupil in the middle of the eye, the mouth opened at the sides, and the under lip drawn back.

In that mixt with anger, the motions are more violent, the parts all agitated, the muscles swell'd, the pupil wild and sparkling, the point of the eye-brows fixt towards the nose, the nostrils open, the lips big and press'd down, the corners of the mouth a little open and foaming, the veins swell'd, and the hair erect.

That with *despair* resembles the last, only more excessive and disorder'd.

9. The hand has a great share in the *Expression* of the sentiments and passions; the raising of the hands conjoin'd towards heaven *expresses* devotion; wringing the hands, grief; throwing them towards heaven, admiration; fainting, and dejected hands, amazement and despair; folding the hands, idleness; holding the fingers indented, musing; holding forth the hands together, yielding and submission; lifting up the hand and eye to heaven, calling God to witness; waving the hand from us, prohibition; extending the right hand to any one, pity, peace, and

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and safety ; scratching the head, thoughtfulness ; laying the hand on the heart, solemn affirmation ; holding up the thumb, approbation ; laying the fore-finger on the mouth, bidding silence ; giving with the finger and thumb, a giving sparingly ; and the fore-finger put forth, and the rest contracted, to shew and point at, as much as to say, *This is he*.

10. The *sex* of the figure is to be regarded ; and man, as he is of a more vigorous and resolute nature, ought to be *express'd* in all his actions freer and bolder than women, who are to be more reserv'd and tender.

11. So also as to the *age*, the different stages whereof incline to different motions both of body and mind.

12. The condition, or honours a person is invested with, renders their actions more reserv'd, and their motions more grave, contrary to the populace, who observe little conduct or restraint, giving themselves for the most part up to their passions, whence their external motions become rude and disorderly.

Lastly, in *spirits*, all those corruptible things must be retrench'd, which serve only for the preservation of life, as veins, arteries, &c. only retaining what may serve for the form and beauty of the body.

In *angels*, particularly as symbolical figures, their offices and virtues are to be mark'd out, without any draught of sensual passions ; only appropriating their characters to their functions of powers, activity, and contemplation.

**EXPRESSION.** Whatever the general character of the story is, the picture must discover it throughout, whether it be joyous, melancholy, grave, terrible, &c. The nativity, resurrection and ascension, ought to have the general colouring, the ornaments, back-ground, and every thing in them riant, and joyous, and in a crucifixion, interment, or a *pietà* [The Blessed Virgin with a dead Christ.] the contrary.

But a distinction must be made between grave and melancholy, as in a holy family (of *Rafaëlle's* design at least) where the colouring is brown, and solemn, but yet altogether the picture has not a dismal air, but quite the contrary ; besides another holy family of *Rubens*, painted as his manner was, as if the figures were in a sunny room ; if *Rafaëlle's* colouring had been the same with *Reubens's* on this occasion, doubtless it would have been the worse for it. There are certain sentiments of awe, and devotion, which ought to be rais'd by the sight of pictures of that subject, which that solemn colouring contributes very much to.

There is a fine instance of a colouring proper for melancholy subjects, in a *pietà* of *Van Dyck* : that alone would make one not only grave, but sad at first sight ; and another instance of a  
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coloured drawing of the fall of *Phaeton* after *Giulio Romano*, which shews how much this contributes to the *Expression*. 'Tis different from all other colourings, and admirably adapted to the subject; there is a reddish purple tinct spread throughout, as if the world was all invellop'd in smouldring fire.

There are certain little circumstances that contribute to the *Expression*. Such an effect have the burning-lamps that are in the cartoon of healing at the beautiful gate of the temple; one sees the place is holy, as well as magnificent.

The large fowl that are seen on the fore-ground in the cartoon of the draught of fishes have a good effect. There is a certain sea-wildness in them, and as their food was fish, they contribute mightily to express the affair in hand, which was fishing. They are a fine part of the scene.

The robes, and other habits of the figures; their attendants, and ensigns of authority, or dignity, as crowns, maces, &c. help to express their distinct characters; and commonly even their place in the composition. The principal persons and actors must not be put in a corner, or towards the extremities of the picture, unless the necessity of the subject requires it. A Christ, or an apostle must not be dress'd like an artificer, or a fisherman; a man of quality must be distinguish'd from one of the lower orders of men, as a well-bred man always is in life from a peasant. And so of the rest.

Every body knows the common or ordinary distinctions by dress; but there is one instance of a particular kind which I will mention, as being likely to give useful hints to this purpose, and moreover very curious. In the cartoon of giving the keys to St. *Peter*, our Saviour is wrapt only in one large piece of white drapery, his left arm, and breast, and part of his legs naked; which undoubtedly was done to denote him now to appear in his resurrection-body, and not as before his crucifixion, when this dress would have been altogether improper. And this is the more remarkable, as having been done upon second thoughts, and after the picture was perhaps finish'd, which may be proved by a drawing of this cartoon, very old, and probably made in *Raffaello's* time, though not of his hand, where the Christ is fully clad; he has the very same large drapery, but one under it that covers his breast, arm, and legs down to the feet. Every thing else is pretty near the same with the cartoon.

That the face, and air, as well as our actions, indicate the mind, is indisputable. 'Tis seen by every body in the extreams on both sides. For example; let two men, the one a wise man, and the other a fool, be seen together dress'd, or disguis'd as you please, one will not be mistaken for the other, but distinguish'd with the first glance of the eye; and these characters are stamp'd  
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upon the face, so as to be read by every one when in the utmost extremes, they are so proportionably when more, or less remov'd from them; and legible accordingly, and in proportion to the skill of the reader.

The like may be observ'd by good, and ill-nature, gentleness, rusticity, &c.

Every figure and animal must be affected in the picture as one should suppose they would, or ought to be. And all the expressions of the several passions, and sentiments must be made with regard to the characters of the persons moved by them. At the raising of *Lazarus*, some may be allow'd to be made to hold something before their noses, and this would be very just, to denote that circumstance in the story, the time he had been dead; but this is exceedingly improper in the laying our Lord in the sepulchre, although he had been dead much longer than he was; however *Pordenone* has done it.

When *Apollo* fleas *Marsyas*, he may express all the anguish, and impatience the painter can give him, but not so in the case of *St. Bartholomew*.

That the Blessed *Mary* should swoon away through the excess of her grief is very proper to suppose, but to throw her in such a posture as *Daniel da Volterra* has done in that famous picture of the descent from the cross, is by no means justifiable.

*Polydore*, in a drawing of the same subject, has finely express'd the excessive grief of the Virgin, by intimating 'twas otherwise inexpressible: her attendants discover abundance of passion, and sorrow in their faces, but hers is hid by drapery held up by both her hands: the whole figure is very compos'd, and quiet; no noise, no outrage, but great dignity appears in her suitable to her character.

In that admirable cartoon of *St. Paul* preaching, the expressions are very just and delicate throughout; even the background is not without its meaning; 'tis expressive of the superstition *St. Paul* was preaching against. But no historian, or orator can possibly give so great an idea of that eloquent, and zealous Apostle as that figure of his does; all the fine things related as said, or wrote by him cannot; for there I see a person, face, air, and action, which no words can sufficiently describe, but which assure me as much as those can; that that man must speak good sense, and to the purpose. And the different sentiments of his auditors are as finely express'd; some appear to be angry, and malicious, others to be attentive, and reasoning upon the matter within themselves, or with one another; and one especially is apparently convinc'd. Some before the Apostle; the others are behind him, not only as caring less for the preacher, or the doctrine, but to raise the apostolick character, which would



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lose something of its dignity, if his maligners were supposed to be able to look him in the face.

*Elymas* the forcerer is blind from head to foot, but how admirably is terror and astonishment express'd in the people present, and how variously, according to the several characters! The Proconsul has these sentiments but as a *Roman*, and a gentleman; the rest in several degrees and manners.

The same sentiments appear also in the cartoon of the death of *Ananias*, together with those of joy and triumph which naturally arises in good minds upon the sight of the effects of divine justice, and the victory of truth.

Nor is the expression in another drawing of the descent of the Holy Ghost less excellent than the other parts of it. The Blessed Virgin is seated in the principal part of the picture, and so distinguish'd as that none of the company seems to pretend to be in competition with her; and the devotion and modesty with which she receives the ineffable gift is worthy of her character. *St. Peter* is on her right hand, and *St. John* on her left; the former has his arms cross'd on his breast, his head reclin'd, as if ashamed of having deny'd such a master, and receives the inspiration with great composure; but *St. John* with a holy boldness raises his head, and hands, and is in a most becoming attitude; the women behind *St. Mary* are plainly of an inferior character. Throughout there is great variety of expressions of joy and devotion, extremely well adapted to the occasion.

I will add one example more of a fine expression, because though 'tis very just, and natural, it has been done by *Tintoret*, in a drawing of his. The story is our Saviour's declaration to the Apostles at supper with him, that one of them should betray him: some are moved one way, and some another, as is usual, but one of them hides his face, dropp'd down betwixt both his hands, as burst into tears from an excess of sorrow that his Lord should be betray'd, and by one of them.

In portraits it must be seen whether the person is grave, gay, a man of business, or wit, plain, gentile, &c. each character must have an attitude, and dress; the ornaments and back-ground proper to it; every part of the portrait, and all about it must be expressive of the man, and have a resemblance as well as the features of the face.

If the person has any particularities as to the set or motion of the head, eyes, or mouth, (supposing it be not unbecoming) these must be taken notice of, and strongly express'd. They are a sort of moving features, and are as much a part of the man as the fix'd ones; some raise a low subject, and contribute more to a surprising likeness than any thing else. *Van Dyck* in a picture has given a brisk touch upon the under-lip, which makes

makes the form and set of the mouth very particular, and doubtless was an air which *Don Diego de Gusman*, whose portrait it is, was accustom'd to give himself, which an inferior painter would not have observ'd, or not have dar'd to have pronounc'd, at least so strongly; but this, as it gives a marvellous spirit, and smartness, undoubtedly gave a proportionable resemblance.

If there be any thing particular in the history of the person, which is proper to be express'd, as it is still a farther description of him, it is a great improvement to the portrait, to them that know that circumstance. There is one instance of this in a picture of *Van Dyck* made of *John Lyvens*, who is drawn as if he was listening at something; which refers to a remarkable story in that man's life. The print is in the book of *Van Dyck's* heads: which book, and the heads of the artists in the lives of *Giorgio Vasari*, are worth considering, with regard to the variety of attitudes suited to the several characters, as well as upon other accounts.

Robes or other marks of dignity, or of a profession, employment or amusement, a book, a ship, a favorite dog, or the like, are historical expressions common in portraits, which must be mention'd on this occasion; and to say more of them is not necessary.

There are several kinds of artificial expressions indulg'd to painters, and practis'd by them, because of the disadvantage of their art in that particular, in comparison of words.

To express the sense of the wrath of God with which our Blessed Lord's mind was filled when in his agony, and the apprehension he was then in of his own approaching crucifixion, *Frederico Barocci* has drawn him in a proper attitude, and not only with the angel holding the cup to him, (that is common) but in the back-ground you see the cross and flames of fire. This is very particular, and curious.

In the cartoon where the people of *Lycaonia* are going to sacrifice to *St. Paul* and *Barnabas*, the occasion of all that is finely told.

The man who was heal'd of his lameness is one of the forwardest to express his sense of the divine power which appear'd in those Apostles; and to shew it to be him, not only a crutch is under his feet on the ground, but an old man takes up the lappet of his garment, and looks upon the limb which he remembered to have been crippled, and expresses great devotion and admiration; which sentiments are also seen in the other with a mixture of joy.

When our Saviour committed the care of his church to *St. Peter*, the words he us'd on that occasion are related by *Rafaele*,  
who

who has made him pointing to a flock of sheep, and *St. Peter* to have just receiv'd two keys. When the story of *Joseph's* interpretation of *Pharaoh's* dream was to be related, *Rafaëlle* has painted those dreams in two circles over the figures; which he has also done when *Joseph* relates his own to his brethren. His manner of expressing God's dividing the light from darkness, and the creation of the sun, and moon, is altogether sublime. The prints of those last mention'd pictures are not hard to be found, they are in what they call *Rafaëlle's* bible, but the paintings are in the *Vatican*; the best treasury of the works of that divine painter, except *Hampton-Court*.

The hyperbolical artifice of *Timanthes* to express the vastness of the *Cyclops* is well known, and was mightily admired by the ancients; he made several satyrs about him as he was asleep, some were running away as frightned, others gazing at a distance, and one was measuring his thumb with his *Thyrus*, but seeming to do it with great caution lest he should awake.

This expression was copied by *Giulio Romano* with a very little variation. *Correggio*, in his picture of *Danaë*, has finely express'd the sense of that story, for upon falling of the golden shower, *Cupid* draws off her linen covering, and two loves are trying upon a touch-stone a dart tipp'd with gold.

I will add but one example more of this kind, and that is of *Nicholas Poussin* to express a voice, which he has done in the baptism of our Saviour by making the people look up, and about, as 'tis natural for men to do when they hear any such, and know not whence it comes, especially if it be otherwise extraordinary, as the case was in this history.

Another way practis'd by painters to express their sense, which could not otherwise be done in painting, is by figures representative of certain things. This they learn'd from the ancients, of which there are abundance of examples, as in the *Antonine* pillar, where to express the rain that fell when the *Roman* army was preserv'd by the prayers of the *Theban* legion, the figure of *Jupiter Pluvius* is introduc'd. *Rafaëlle* in the passage of *Jordan*, has represented that river by an old man dividing the waters, which are roll'd and tumbled very notably.

I will add but one way of expression more, and that is plain writing.

*Polygnotus*, in the paintings made by him in the temple of *Delphos*, wrote the names of those whom he represented.

The old *Italian* and *German* masters improv'd upon this; the figures they made were speaking figures, they had labels coming out of their mouths with that written in them which they were intended to be made to say; but even *Rafaëlle* and *Annibale Carracci*, have condescended rather to write than leave any ambiguity,

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biguity, or obscurity in their work: thus the name of *Sappho* is written to shew 'twas she, and not one of the muses, intended in the *Parnassus*: and in the gallery of *Farnese*; that *Anchises* might not be mistaken for *Adonis*, *Genus unde Latinum* was written.

In the cartoon of *Elymas* the forcerer, it does not appear that the pro-consul was converted, otherwise than by the writing; nor do I conceive how it was possible to have express'd that important circumstance so properly, any other way.

In the *pest* of the same master, grav'd by *Marc Antonio*, there is a line out of *Virgil*, which, as 'tis very proper (the plague being that describ'd by that poet, as will be seen presently) admirably heightens the *Expression*, though without it 'tis one of the most wonderful instances of this part of the art that perhaps is in the world in black, and white, and the utmost that human wit can contrive; there is not the most minute circumstance throughout the whole design, which does not help to express the misery there intended to be shewn; but the print being not hard to be seen, need not be describ'd.

Writing is again used in this design; in one part of it you see a person on his bed, and two figures by him; this is *Æneas*, who (as *Virgil* relates) was advis'd by his father to apply himself to the *Phrygian* Gods to know what he should do to remove the plague, and being resolv'd to go, the deities appear to him, the moon shining very bright, (which the print represents;) here *effigies sacræ divom Phrygiæ* is written, because otherwise, this incident would not probably have been thought on, but the group would have been taken to be only a sick man, and his attendants.

You must not expect to find the true airs of the heads of that great master *Rafaëlle* in prints, not even in those of *Marc Antonio* himself. Those are to be found only in what his own inimitable hand has done, of which there are many unquestionably right in several collections here in *England*; particularly in those very admirable and copious ones of the Duke of *Devonshire*, and the Earl of *Pembroke*; but *Hampton-Court* is the great school of *Rafaëlle*!

Besides him, I know of none of the old masters that are remarkable for *Expression*, unless for particular subjects; as *Michael Angelo* for infernal, or terrible airs; and amongst others, the drawing he made for the *cartoon* in the famous picture of his last judgment, which is admirable in this kind; others of later times have succeeded well in this part of the art, as *Domenichin*, and *Rembrandt*; but these are the principal; only for portraits, and herein, next to *Rafaëlle*, perhaps, no man has a better title to the preference than *Van Dyck*; no not *Titian* himself, much less *Rubens*.

But

## E X P

But there is no better school than nature for *Expression*. A painter therefore should on all occasions observe, how men look, and act, when pleas'd, griev'd, angry, &c.

### Of EXPRESSING *the* PASSIONS in *the* COUNTENANCE.

*Love* is express'd by a clear, fair and pleasant countenance, without clouds, wrinkles or unpleasant bendings; giving the forehead an ample height and breadth, with a majestick grace; a full eye with a fine shadow at the bottom of the eye-lid, and a little at the corner; a proportionable nose; nostrils not too wide; a clear cheek made by shadowing it on one side, and a smiling mouth, made by a thin upper-lip, and shadowing the mouth-line at the corners.

*Fear* is express'd by making the eyes look hollow, heavy and downwards, thin fallen cheeks, close mouth and careless staring hair about the ears.

*Envy* is best decyphered by only the hanging of the cheeks, and a pale countenance; and sometimes by grinding of the teeth.

Let every passion be represented according to its outward appearance, as it is in those persons in whom it reigns, observing the rules laid down in the article IMITATION of *Draughts*.

If you would aim at an exquisiteness in this art, you must endeavour to chuse out the best actions for every purpose, in restraining the luxurious fancy of nature by a deliberate discretion, which you ought to have in the idea; by the benefit of which you will finish your design with delight and contentment; always expressing in each member a certain hidden resemblance of the principal motions which affect the eye, and soul of the spectators, and merit the chiefest commendation.

To express a passion truly, you ought to give every thing and part its proper motion, or that which best befits your intention; which is nothing else but the agreement of proportion and form to the nature and matter of the action or passion intended, wherein consists the whole spirit and life of the art, which by artists is sometimes call'd the *fury*, sometimes the *grace*, and sometimes the *excellency* of the art. For hereby an evident difference is made between the *living* and the *dead*; the *fierce* and the *gentle*; the *wise* and the *simple*; the *sad* and the *merry*; and in a word discover all the several passions and gestures, which the body of a man is able to perform.

But these things are impossible ever to be exactly done in a picture, till you have first intently viewed and considered the life, that by this means you may come as near the life as possibly may be; to which adding art withal, you will meet with no motions so potent, which you will not be able artificially to imitate.

These

These things will be the more exactly accomplish'd, if you are viewing and continually practising what you have seen.

By this means you will unawares attain an exact habit of doing well, and lively express all gestures, actions and passions subject to natural bodies.

The *passions* of the mind are certain motions proceeding from the apprehension of some moving or powerful object, now this apprehension is threefold, *viz. sensitive, rational and intellectual.*

From these three there arise three principal passions of the mind, *viz. pleasures of the senses, moral virtues or vices; and a pious religious life, or irreligious and wicked.*

To EXTEND or CONTRACT a PICTURE.

1. Encompass the picture with one great square, which divide into as many little ones as you please; having done this according as you would have your picture, either greater or less, make another square greater or less, which divide into the same number of equal squares, which let be drawn with a black-lead plummet.

2. Take your black-lead pen, and draw the picture by little and little, passing from square to square (by the example of the pattern) until you have gone all over with it; observing that in what part of the square the picture lies, you draw the like part in the square answerable thereto, till you have finish'd the whole.

3. Then draw it over with a pen, in which second drawing of it, you may easily mend any fault, and shadow it at pleasure.

4. Lastly, when it is thoroughly dry, rub it over with the crum of white bread, and it will take off all the black-lead strokes, so will the draught remain fair upon the paper.

EYES. For the drawing of *Eyes*. See the PLATE.

EYES, [to paint in miniature] shade the white of the *Eyes*, with a faint blue and light flesh colour, and do the corners on the sides of the nose with *vermilion* and *white*, with a small stroke of *carmine*. All this is softened with a mixture of *vermilion*, *carmine*, and *white*, and a very little *oker*.

The *iris* of the *Eye* must be a mixture of *ultramarine* and *white*, this little more in quantity than the other, adding thereto a little *bistre*, if it be of a kind of a light hazel or a little black, if it is too grey.

The *pupil* or sight of the *Eye* must be done with *black*, and the *iris* shaded with *indigo*, *bistre* or *black*, according to the colour it is of; but of what colour soever it is, it will be proper to draw a fine circle of *vermilion* round the sight, which blended with the rest in finishing gives life to the *Eye*.

The circumference of the *Eyes*, that is the sight and lashes, are to be done with *bistre* and *carmine*, when they are strong,



## F A C

particularly the upper part, which must be afterwards softened with red or blue mixtures mentioned at the latter end of the article of CARNATION, that the whole may appear of a piece and continued.

Having done this, give a small touch of pure white, upon the sight of the *Eye* next to the light, which makes it shine and alive.

You may also heighten the white of the *Eye* next the light.

*The EYE-BROWS and the BEARD* are colour'd like the shades of the flesh, (See CARNATION) and are finish'd with *bistre*, *oaker* or *black*, according to the colour they are of, drawing them with fine strokes as they ought to lie, in exact imitation of nature; and heighten the lights with *oaker*, *bistre*, a little *vermilion* and a good deal of *white*.

JOHANNES *ab EYK*, commonly call'd JOHN of BRUGES, born at *Masseyk* on the river *Maez*, in the *Low-Countries* anno 1370, was a disciple of his brother *Hubert* and a considerable painter; but above all things famous for having been the happy inventor of the art of painting in oil anno 1440, (thirty years before printing was found out by *John Guttemberg* of *Strasburg*) he died anno 1441, having some years before his decease communicated his invention to his sister *Margaret*.

## F.

**F**. B. stands for *Francis Briccio* of *Bologna*, painter; he engrav'd the pieces of *Lewis Carracci*.

F. B. B. Father *Bonaventura Bisi* of *Bologna*, call'd *il Padre Piteorino* or the painting friar.

F. B. V. I. signifies *Frederic Barocci* of *Urbino*, *inv.* he sometimes instead of the I put F, *i. e. fecit*.

*The PROPORTION of a man of ten FACES.*

From the top of the head to the sole of the foot is divided into ten equal parts.

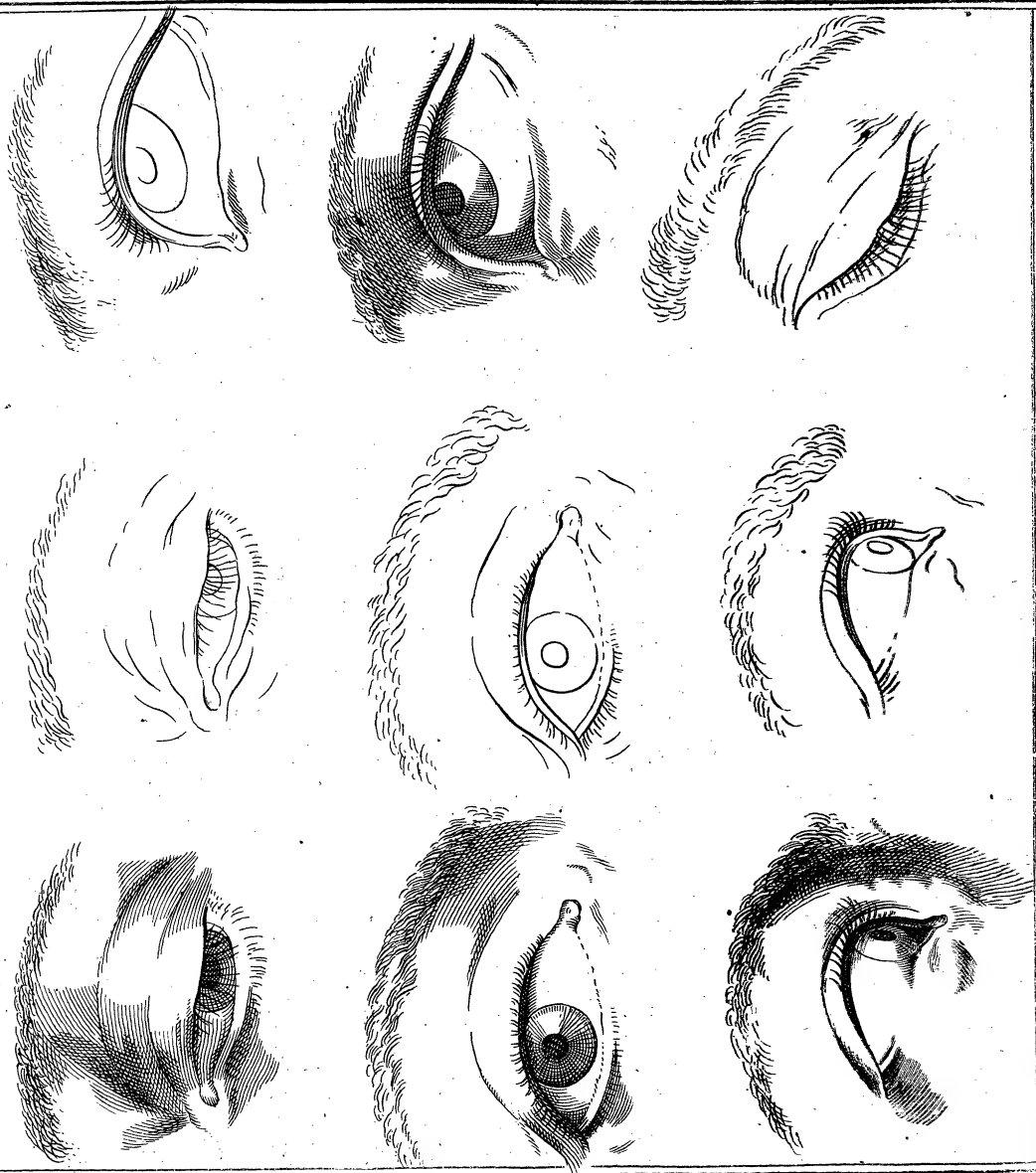
1. The first distance begins at the top of the head, and reaches to the root of the chin.
2. The second from thence to the throat pit.
3. The third from thence to the parting of the breasts.
4. The fourth from thence to the privities, which is just the middle of the length of the body.

From thence to the sole of the foot are five parts more; two of which are between the privities and the mid-knees; and three more to the sole of the foot.

The first of the ten parts, which is for the face is to be divided into three equal parts; the first beginning at the upper-part of the

the







## F A C

the forehead, and ending upon the upper cross line of the eye-brows.

The *second* distance reaches from thence to the bottom of the nose.

The *third* reaches to the bottom of the chin, which is the first and uppermost division.

Now in a fore-right, be sure to place the eyes the length of one eye distance from another; and the length of one eye the bottom of the nose is to be.

The breadth of this body also consists of ten *Faces*, viz. between the extremities of both the middle fingers, when the arms are extended or spread abroad; and it is thus divided,

1. The *hand* from the *end* of the *middle-finger* to the *wrist*, is the length of a *Face* (or one of the tenth parts.)

2. From the *wrist* to the *elbow* a *Face* and a half.

3. From the *elbow* to the *shoulder* joint two *Faces*.

4. From thence to the throat pit one *Face*.

The hands have the proportion of one *Face*.

The *nipples* must be plac'd at the distance of a *Face* and a half from each other, equal to the distance between the *wrist* and the *elbow*.

The compass of the head from the eye-brows to the neck behind, is double to the length of the whole head.

The compass of the *waste* is the distance of three *Faces* to the diameter of it, and is all one with the trunk of the body.

The circumference of the body under the armpits, and the space between them and the wrists, answer in a double proportion, and is agreeable to half of the body.

*The proportions of a young man of nine FACES.*

A slender young body of nine heads is equal to nine times the space between the top of the head, and the end of the chin, that being a ninth part of the length of the whole body, and thence back again to the root of the hair a tenth or eleventh part. By which way soever you draw it, this space is also divided into three equal parts, the first of which makes the forehead, the second the nose, the third the chin.

However in a *Face* for the eleventh part is a tuft of hair which is usually express'd, so that the forehead becomes lower by a third part; which rule the ancient *Grecians* always observ'd.

*The proportions of a man of eight FACES.*

First draw a strait perpendicular line of the length you design the figure; divide this line into eight equal parts, the uppermost part of which is the length of the head, in which you must take care to be very exact, because the whole body must answer in proportion to it.

## F A C

Make that eighth part into an oval, dividing the oval into four equal spaces ; the first is to be for the *hair*.

*To draw a fore-right FACE.* In doing this it will be necessary to form a perfect oval, which divide in the midst with a line, the longest way or perpendicular line, this line divide into three equal parts, allowing a fourth of one of the three parts for the hair on the forehead ; the first for the forehead, the second for the nose, the third for the chin.

In the midst of these form the mouth, always being sure to make the eyes in one line, the cross-line of the nose and mouth must always correspond with the cross-line, where the eyes are plac'd, and the eyes must be the length of the distance from one eye to another ; and their inward corners must be exactly perpendicular over the outside of the nostrils ; but to make the ears in a fore-right *Face* proportionable, they must be much fore-shortened by fore-shortening ; that is the eye does not see the full latitude of it. The proportion of the length of the ear is to be from the eye-brows to the bottom of the nostrils ; and then join the neck with the hair, in such a manner as may be most pleasant to the eye. See the plates for *FACES* and *HEADS*.

If you would draw a *Face* after the life, that it may resemble the party you draw it after, take notice in the first place, of the physiognomy or circumference of the *Face*, whether it be round or long, fat or lean, big or little, so that in the first place, you must be sure to take the right physiognomy and bigness of the *Face* ; and in case it be a fat *Face*, you will perceive the cheeks to make the side of the *Face* to swell out, and so make the *Face* look as if it were square ; and if it be neither too fat nor too lean, it will be round for the most part ; but if it be a lean *Face*, the jaw-bones will stick out, and the cheeks fall in, and the *Face* will be long and slender.

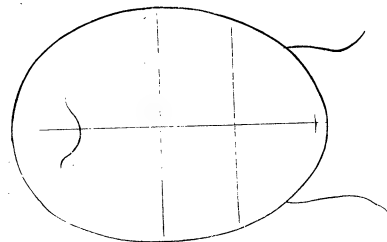
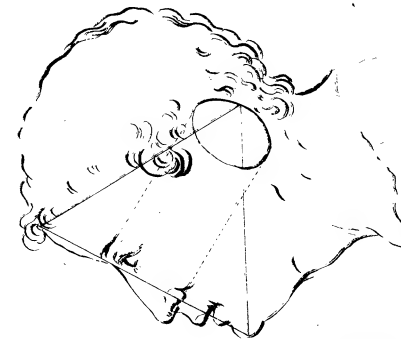
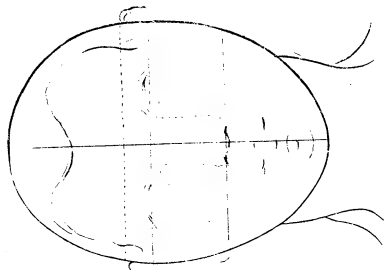
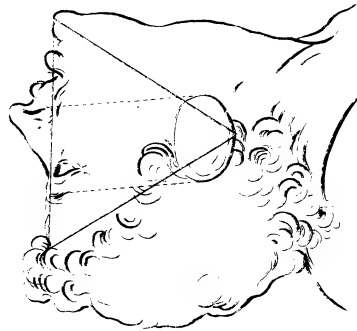
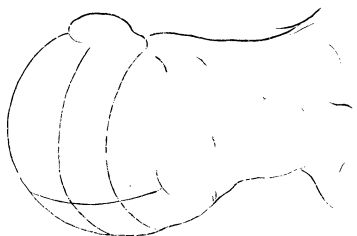
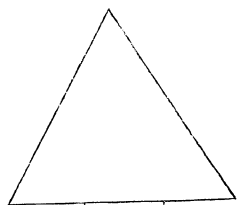
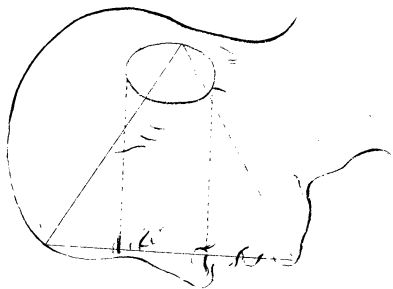
But remember when you draw the outmost circumference of a *Face*, that you must take the head and all with it, or otherwise you may be deceiv'd in drawing the true bigness of a *Face*.

You must likewise take a diligent observation of all the master touches, which give the spirit and life to a *Face*, and discovers the grace or disposition of the mind ; wherein lieth the whole grace of the work.

You may easily discern a smiling countenance in the corners of the mouth, when they turn up a little : a stay'd and sober countenance may be discern'd in the eyes, when the upper eyelids come somewhat over the balls of the eyes.

A frowning countenance is easily discern'd on the fore-head, by the bending of the eye-brows, and some few wrinkles about the top of the nose.

A laugh-





## F A C

A laughing countenance is easily discerned all over the *Face*; and an angry countenance is discern'd by extraordinary frowning; there are also some touches about the eyes and mouth, which must be diligently observ'd, which give life and spirit to a *Face*. See the plates of the various *passions* in their proper places.

### *The painting of a FACE.*

The cloth tablet, &c. being prepared you must lay a ground or primer of flesh colour, before you begin your work, and that must be tempered according to the complexion of the *Face* to be drawn; if the complexion be fair temper *white*, *red-lead* and *lake*; if an hard swarthy complexion, mingle with the *white* and *red* a little fine *masticote* or *English oaker*.

But you must take notice of this, that your ground ought always to be fairer than the *Face* you take, for it is easy to darken a light colour, but difficult to lighten a deep one; for in limning you must never heighten, but work them down to their just colour.

Having prepar'd your ground colour, lay it on with a large pencil, as smooth, even and free from hairs as possible, with a pencil full of colour, rather thin or waterish than thick and gross, and with two or three dawbs of your great pencil lay it on in an instant; the nimbler it is laid on the evener the colour will lie.

You ought to cover rather too much than too little of your ground with this *prime*, than you shall use for the *Face*.

Having done this, take a pretty large pallet of *ivory* or other matter, and before you begin to work, temper certain little heaps of the shadows for the *Face*, on the pallet with your finger.

### *The order of shadows for the FACE.*

In all your shadows mix some *white*; for the *red* in the *cheeks*, *lips*, &c. temper *lake*, *red-lead* and a little *white*; for the *blue* as the *veins*, &c. a little *indigo* and *white*; for the faintest and weakest colour or shades, *lake* and *white*, a little *oker* and a little *indigo*; and if you please a very small quantity of *pink* or *masticote*; for the deeper shadows *white English oker* and *umber*; for the darkest and hardest shadows use *lake* and *pink*, mix'd with *umber*.

Remember this, that you must by no means use *black* in a *Face*.

These colours for shadows being thus prepar'd on your pallet, draw the lines of profile (*i. e.* the outmost stroke) of a *Face* with *lake* and *white* mingled very faint; by this you may conveniently mend the draught (if false) with a deeper mixture of the same colour; having drawn the lines exactly and in true proportion (which is the chiefest thing of all) in the next place observe the



## F A C

deeper and more remarkable shadows, and with the same faint *crimson* colour of *lake* and *white*, give some slight touches and marks somewhat roughly of these shadows, which you are to finish afterward.

### *The order of drawing at the first sitting.*

First, you must only dead colour the *Face* as the *oil painters* do, and not meddle with the rest, and this first sitting commonly takes up two hours.

The *dead-colouring* of a *Face* is to be done the roughest and boldest of all; having drawn your *Face* with *lake* and *white* (as before) you must take to the said colour a little *red-lead*, tempering it to the colour of the *cheeks*, *lips*, &c. because you cannot lighten a deep colour, without danger of spoiling the picture.

The first colour to begin the *Face* with, is the *red* of the *cheeks* and *lips*, somewhat strongly the bottom of the *chin*, if the person be beardless; over, under and about the *eyes*, you will perceive a delicate and faint redness, and underneath the *eyes* inclining to a purple colour, which in fair and beautiful *Faces* is usual, and must be observ'd; the *tip* of the *ear* and the roots of the hair, are commonly of the same colour.

All this you must do after the manner of *hatching* with faint and gentle strokes, washing it all along.

In short, in your *dead colouring* you must cover your ground with the aforesaid *red*, and the subsequent shadows.

You need not be over curious in your first working; but regard a good bold following of nature, rather than smooth curiosity; the roughness of the colour may be mended at the next sitting.

### *The second sitting.*

This commonly requires four or five hours, in which you are to go over the *Face* very curiously, observing whatever may conduce either to likeness or judicious colouring; also taking notice of the several *graces*, *beauties* or *deformities*, as they appear in nature; or else in smoothness of shadows or close and sweet touching the colours.

Having done the *red*, the next are the *faint-blues* about the *balls* and corners of the *eyes*; and the *grey* and *bluish* under the *eyes*, the temples, &c. which you must work from the uppermost part of the *Face* almost all over, but exceeding sweet and faint; sweetening and heightening your shadows by degrees; as the *light* falls.

And in going over the *Face* be sure to mark out the hard shadows in the dark side of the *Face*, under the *nose*, *chin*, *eyebrow*, &c. as the lights fall, and somewhat strong touches; in those

those bring up your work together in an equal roundness, not giving perfection to any particular part of the *Face*; but visiting all the parts curiously, and in a kind of random manner; by which means you will better perceive the *likeness*, *roundness*, *postures*, *colouring*, or whatever else is requisite to the perfection of your work.

The party being set just in his former seat, you must most exactly observe, and curiously delineate with your pencil those several varieties of nature, which you did rudely trace out before, *working*, drawing and *sweetening* the same colours into one another, to the end, that nothing be left in your work with a hard edge, uneven or a lump together; but also so swept and driven one into another, with the point of somewhat a sharper pencil than that at first us'd, that the shadows may lie soft and smooth, being dispers'd and gently extended into all; and towards the lighter parts of the *Face* like *air* or a *vapoury smoak*; but before this, you must carefully observe all the *shadows* and *colours*.

In the next place go over the hair heightening and deepening it, as you shall see by the *life*, drawing some locks loosely over the *ground*, which would otherwise seem unpleasant.

To shadow *linen* use *black*, *white*, a little *yellow* and less *blue*; the *black* must be deepened with *ivory-black*, with which mix a little *lake* and *indigo* or *litmus-blue*.

#### *The third sitting.*

The third sitting commonly takes up two or three hours, and is spent in closing, what was before left imperfect and rough, but principally in giving to every deep shadow the strong touches and deepening, as well in the dark shadows in the *Face* as in the *eyes*, *eye-brows*, *hair* and *ears*, and these touches are ever the last part of this business, and are never to be done, till all the hair and drapery be finish'd; these touches if well done add exceedingly to the life.

Having done the *fainter* or *lighter shades*, and somewhat smooth'd and wrought them into *red*, you may go over the *hair*, disposing it into such *forms*, *folds* or *tramels*, as may best become the picture.

You must at first only draw them with colour, as near as you can suitable to the life, and after wash them lightly at the first, and then once more peruse your work, carefully filling up the void, empty and bare places which are uncovered with colour; and at last deepen it somewhat more strongly than before in the deepest shady places; still carefully observing the life, and after this do your ground, &c. See GROUND.

The *third sitting*, as has been said, will be wholly taken up in giving the strong touches, and making the observations ne-

## F A M

cessary for *rounding* the *Face*, which will be better seen how to do; after the apparel, hair, and ground are finish'd at the *third sitting*, you must curiously observe whatever may conduce to likeness, as *scars*, *moles*, &c. *glances* of the *eyes*, *descending* and *circumflexions* of the mouth; but never make your deepest shadows so deep as they appear in the *life*.

After you have done your *ground*, lay your linen with a *flat white*, and the *drapery* likewise *flat*. See DRAPERY; then go over your *Face* again, endeavouring to reduce each shadow to its true perfection; then draw the lines of the *eye-lids*, expressing the *red-dark nostril*, the shady entrance into the *ears*, the deepness of the *eye-brows*, and those more perspicuous notes and marks in the *Face* with a pencil somewhat more curious and sharp than before; you may darken your ground as you see will be most advantageous for the setting off the picture.

FADINGNESS is represented in painting, by a lady clad in green, her garment all embroider'd with pearl and precious jewels, with a golden crown in one hand, a lighted torch with this motto, *egrediens ut fulgur* in the other, and a nose-gay of roses, part of which fall to the ground, fading and discolour'd.

The rose in the morning buds, is fragrant and flourishing, and in the evening languishes and fades, a true emblem of the frailty of sublunary things.

FAITH is represented in painting, by a woman clothed in white garments, holding in her hand a cup of gold.

WILLIAM FAITHORN, was a disciple to Mr. *Peak* painter to Prince *Rupert*; after the civil wars broke out, he went into the army, and being taken prisoner in *Basing-house*, and refusing to take the oaths to *Oliver*, was banished to *France*; where he studied several years under *Campagne*, a famous painter of that time, and arriv'd to a very great perfection in correctness of drawing. He was also a great proficient in graving, as likewise in painting in miniature, of which there are many instances now in *England*; he died in *Black-Fryars* about the beginning of King *William's* Reign, and there was buried, near seventy five years of age.

FAME is painted like a lady with great wings, and seeming to proffer a flight, and to mount from the *earth*, and to rove abroad, having her face full of eyes; all over her garments are an infinite number of ears and tongues.

She is also represented as a lady clad in a thin and light garment, open to the middle thigh, that she might run the faster; two exceeding large wings; garments embroidered with eyes and ears, and blowing a trumpet.

FAME. It is also represented by a curious figure of a naked *Mercury*, with a cloth over his left arm, and his rod in his  
hand

## F E A

hand holding *Pegasus* by the bridle, capering as if he would fly away.

*Mercury* denotes fame, for he was messenger to *Jupiter*; as also the efficacy of speech and a good voice, that spreads and is diffused; *Pegasus* denotes that fame is carried by speech, that sounds the actions of government.

PAOLO FARINATO, born in the year 1522, scholar to *Nicolo Golsino*, liv'd at *Verona* and *Mantua*, excell'd in history, sculpture and architecture, died in 1606, aged eighty four years.

FASTING is represented in painting, by a man pale and meagre, in a white antique dress; he is muzzled, his eyes lifted up to heaven, his right arm extended, and in his hand is the fish bull-head; on a scroul is written *Pauco Vescor*, a hare under his left arm and he treading upon a gaping crocodile.

His paleness demonstrates the effect of *Fasting*, the white raiment denotes his sincerity, not only to abstain from food, but also from vice; looking upwards that his mind is not offuscated with meat; the fish lives upon his own moisture, and eats little as the motto declares; the crocodile voracious and an enemy to fasting, therefore he treads it under foot; the hare intimates vigilance.

FATE is represented as a man clad in a fair, long, flaxen robe, looking upwards to two bright stars, encompass'd with thick clouds, from whence hangs a golden chain.

FAUNS. } These and fairies were represented much in  
SYLVANS. } the same form as *Pan*, having little short horns  
SATYRS. } growing on their heads, with small ears and short tails.

FEAR. *Pausanias* says, *Fear* was shap'd in several forms by the ancients; sometimes with the head of a lion, and sometimes with the deform'd face and body of a woman.

FEAR is an apprehension of an evil to come, fore-running the evils with which we are threatened.

But if there be no appearance of obtaining what we desire; then instead of hope comes *Fear* or *Despair*. The motion of *Fear* is express'd in *drawing*, &c. by the eye-brow a little rais'd next the nose; the ball sparkling in an unquiet motion, and situated in the middle of the eye; the mouth open, being drawn back, and more open at the corners, than in the middle, having the under lip more drawn back than the upper; the complexion redder than even in *love* or *desire*; but not so beautiful, inclining to livid, with the lips of the same colour and dry.

*Fear* sometimes may have motions resembling those of *terror*, being only caus'd by an *apprehension* of losing something, or that some ill should befall us; this passion may give motions to the body, which may be represented by the shoulders press'd together,

## F E R

ther, the arms and hands drawn close to the body ; and the other parts gathered together and bended, expressing as it were a trembling.

FEBRUARY is drawn in a dark sky colour, carrying in his right hand the character of the sign of the zodiack, call'd *Pisces*.

F. C. Stands for *Franceschino Caracci* of *Bologna*, younger brother to *Augustin* and *Hannibal*.

FEET. For drawing Feet there is not so much difficulty as in that of hands, and in drawing them, you must proceed the same way that was shewed for drawing of hands. See the proportions in the plate.

To foreshorten feet seen forwards, you must make the foot aside with its proportions and measures on the inside of the foot marked A, and from these proportions and measures marked 1 2 3 4, draw down perpendiculars until you cut the diagonal, and continue thence lines parallel, to make the shadowed foot under the place of the foreshortened foot, and from the said shadowed foot, you must raise perpendiculars unto the place of the said foot to be shortened, which there meeting with the level lines that proceed from the first foot by intersection of them, there giveth us the said foot geometrically foreshortened, as appears here represented. Herein the toes of the feet are marked A B C D E, and the like is to be observed for the foot seen by the heel marked B, and also for the foot marked with C seen on the fore-part ; and lastly, in like sort for the foot marked with D, are foreshortened by the same rule as the former.

When you can draw hands and feet pretty well, then proceed to arms and legs, and afterwards to whole bodies, in which there will be but little difficulty when you can draw hands and feet.

FELICITY is represented as a lady, sitting on an imperial throne, holding in the one hand a *caduceus* or rod, and in the other hand a *cornucopia*.

FERN. It is a vulgar error that *Fern* and other capillary herbs have no seed, for they have it in great quantities, like dust, and of a dark brown colour on the back-side of their leaves : nay, mosses also abound in seed, as is evident in an undescribed sort of *chamapeuce*, which is like a *larynx* in the branches of the *Fern* ; and betwixt each leaf you'll find an abundance of round and brownish seeds, provided it be cut at the time elsewhere mentioned ; for it is very necessary to take notice of the times and seasons that all plants and trees ought to be cut in, that they may answer the ends designed. For extracting of oyls and spirits of vegetables in *chymistry* for medicinal uses, they must be cut a little before their maturity, whether you use  
the

## F E R

the stalks or the leaves; for then they will yield one half more than at another time, as experience testifies.

*To make FERETTO of Spain for tinging glass.*

The name *Feretto* comes from the *Italian* and *Spanish*, and is so call'd because it is found in iron mines; and commonly *Feretto* of *Spain*, because the most part of what was sold in other parts of *Europe*, and which was the best, was found in those mines, and come to us from thence.

There is some of it black like iron, and which communicates its colour to the matter, in which it is us'd, which is the reason it ought to be chosen; for good *Feretto* is known by its being red, and being beaten, imitates the colour of *cinnabar*, which it always does, when it is pretty well calcin'd.

*Pomet* in his history of drugs, says, that the *lapis hæmatites* is what we commonly call the *Feretto* of *Spain*; that this mineral is of a reddish colour, hard, weighty, and pointed with long and sharp points; that it is brought from several places, for as much as there are no iron mines in which it is not found.

That the name *hæmatites* is given it of *haima*, which signifies blood, because this stone is good for stopping of blood; and it is call'd the blood-stone, because it is of the colour of blood, and *Feretto* because it is found in iron-mines.

Although *Feretto* be found in mines, yet it may be artificially made much better.

Excellent *Ferretto* us'd to be made antiently in *Cyprus* and at *Memphis*, the metropolis of *Egypt*; but it is not now in use, as heretofore.

*Neri* and *Merret* who have written of the art of *glass*, use only *copper* or *brass* for making of *Ferretto*; but nevertheless true *Ferretto* cannot be made without iron or steel, also iron and copper are somewhat of a like nature, since it is easy to convert the former into the latter; wherein there is far more vertue for several operations, than in the natural copper, and it is finer, more pure, and redder.

*An ordinary way of making Ferretto is this.*

Take filings of iron very clean, and sulphur beat to powder, put them in a crucible, layer over layer, or first one layer of sulphur, then one of filings, and so on; beginning and ending with the sulphur, which is call'd *stratification*, or *stratum super stratum*.

After you have done this, you must cover the crucible with another, or with a tile, and lute it close, and set it into a furnace with coals round it for six hours, increasing the fire every two hours, that is, for the two first hours let the fire or coals be half a foot from the crucible, the two second about a quarter

ter

## F E R

ter of a foot, and the two last let it be covered all over with coals.

*Another extraordinary way of making FERRETTO of Spain,  
which is a great secret.*

This way of making *Ferretto* is not common, nor much known; it is of a very wonderful use, not only for tinging glafs, but for several chymical operations, especially if a second and farther preparation be made of it. But as for that for tinging glafs only,

Take very fine steel, for all the excellency of the work consists in the perfection of that; make it into thin plates, or file it; also do the same with *copper* or *brass*, viz. make that also into thin plates, or take the filings, one part to two of steel; put them into a crucible *stratum super stratum*, lute them, and put it on a gentle fire for eight hours; then take it out, and melt the whole in a wind furnace; then cast it into a lingot, or in little plates, and the business is done.

To make use of this in glafs, you must calcine these plates; then pound them and searce them, and keep that powder in a pot close stoppt for use.

*Another way of making FERRETTO of only copper for  
tinging glafs.*

This second way of making *Ferretto* is something more troublesome than the former; but the effects of it in glafs are far finer.

In this method, you must take *vitriol* instead of sulphur, wherewith you statify the thin plates of copper in the crucible, just as in the preceding chapter; then set this crucible to calcine in the mouth of a glafs furnace, which the *Italians* call *occhio* and the *French* the *little working hole*, where let it stand for the space of three days.

Then take out the crucible, and add to the *copper* new rows or layers of *vitriol*, stratifying it as before; then set the crucible in a reverberatory fire in the same place as before, which you must continue to do for six times successively one after another, and then you will have a very excellent *Ferretto*, which you are to reduce to powder, and it will tinge glafs of extraordinary beautiful colours.

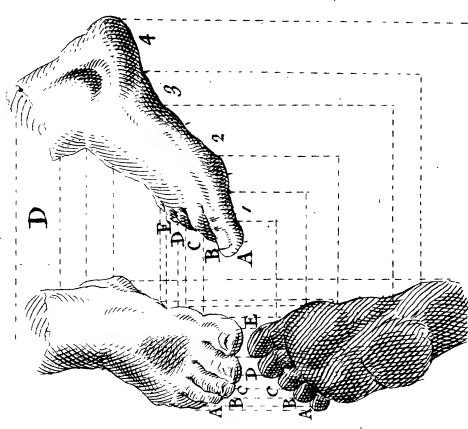
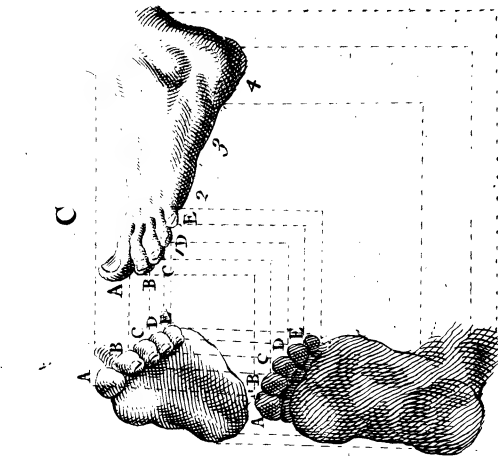
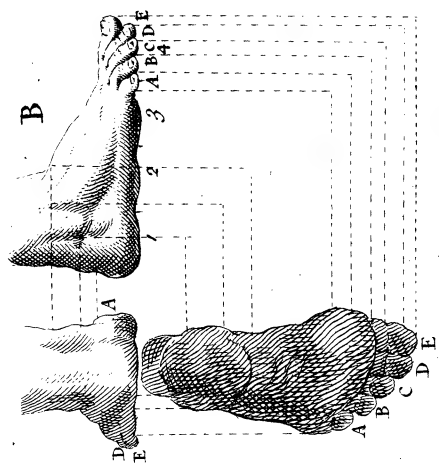
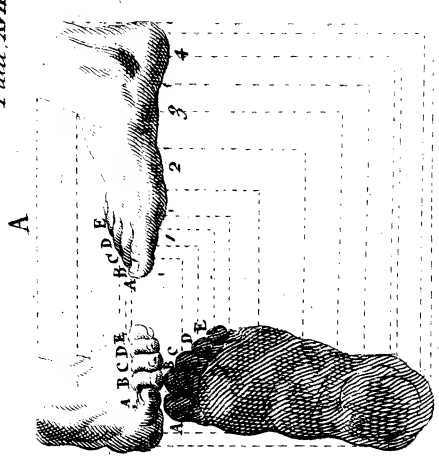
*The way of making FERRETTO of only copper for ting-  
ing glafs.*

*Neri* and *Merret* give the name of *Ferretto* of *Spain* to the following preparations, asserting, that it communicates several very fine colours to glafs.

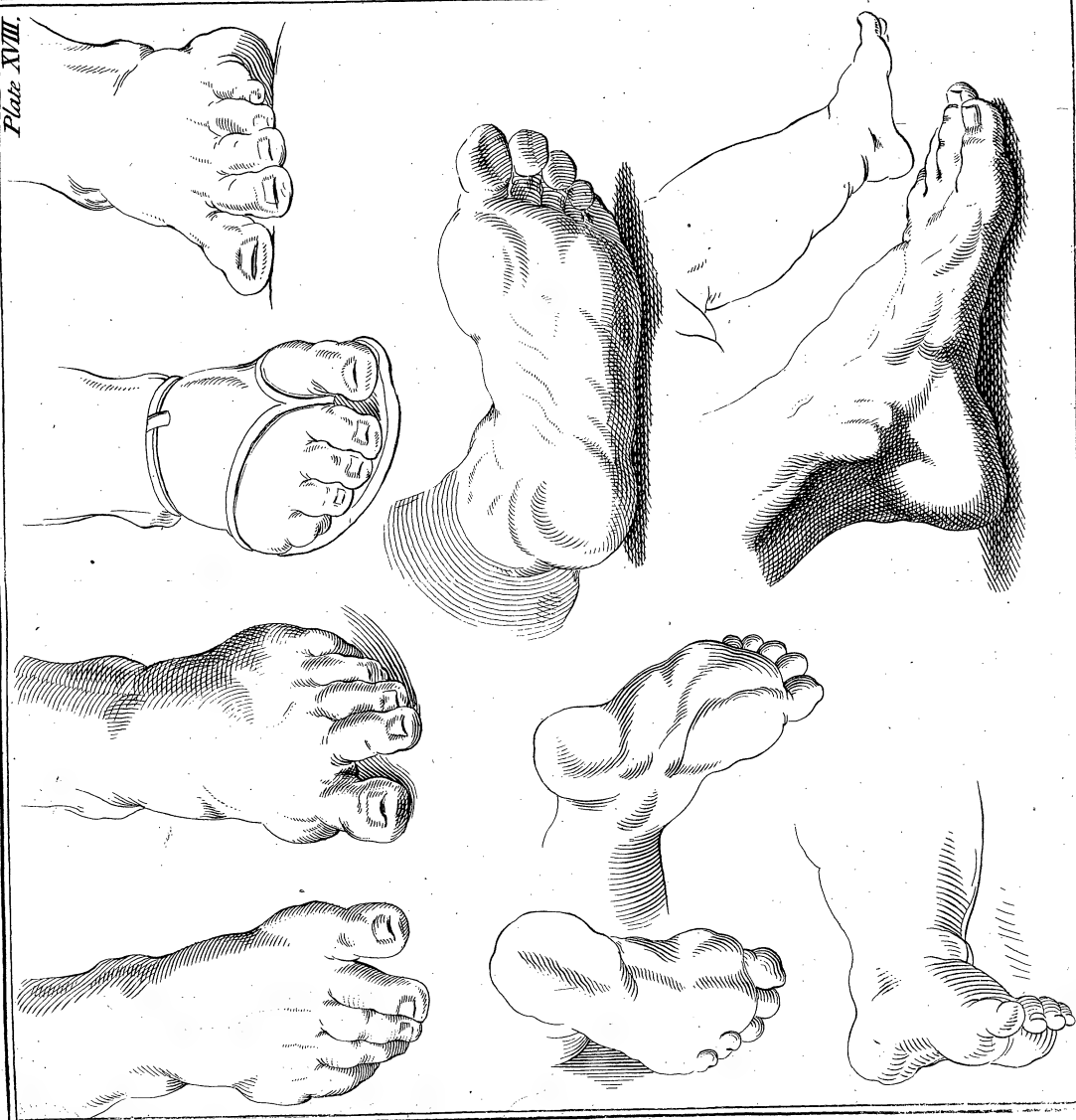
The different ways of calcining metals, causes different effects.

If











## F E V

If the *Ferretto's* before-mentioned be of vast use in glass, and very serviceable in *pastes, enamels, and glass of lead*, by reason of the great resemblance it gives to precious stones, this and the following are of no less use.

Take thin plates of *copper* or *brass*, cut them into pieces, and put them into a crucible, in the bottom of which you have laid a bed of *sulphur* pulveriz'd; then a layer of *copper*; then another of *sulphur*, which you must thus continue *stratum super stratum* till the crucible is full.

Then cover the crucible with another, or with a tile, and lute it well, and dry it, and put it into a furnace among hot coals in a good brisk fire for the space of two hours; then take out the crucible, let it cool, and you will find the copper or brass calcin'd, which will break and crumble between your fingers like dry earth of a blackish colour.

This is to be pounded in a mortar to a fine powder, searc'd, and kept in a vessel well clos'd for use.

CIRO FERRI, born in the year 1628, scholar of *Peter Cartona*, liv'd at *Rome*, excell'd in history and architecture, died in the year 1690, aged sixty-two.

FESTOON, a *garland*, or ornament of flowers, fruits and leaves intermix'd; antiently much us'd at the gates of temples, where feasts or solemn rejoicings were held; or at any other places where marks of publick joy and gayety were desired, as at triumphal arches, tournaments, &c.

DOMENICO FETTI, born in 1589, scholar of *Ludovico Civoli*, and studied *Julio Romano*; liv'd at *Rome, Mantua, and Venice*, excell'd in history, died in the year 1666, aged seventy six years.

FEVER is represented in painting by a young woman meagre and pale, having black hair, hot vapour issuing out of her mouth, a lion at her feet, very melancholy, holding one hand upon her heart, and in the other the chain of a slave inscrib'd, MEMBRA CUNCTA FATISCUNT.

She is young, because young persons are most subject to Fevers; her mouth open signifies the included heat wants vent; the lion denotes a Fever, because he is always in one; the chain shews, that it affects all the parts by the arteries diffused thro' the members.

LE FEVRE DE VENISE, was a *French* history painter, who came into *England* in the reign of King *Charles II.* He was better at designing, as appears by his work, than for painting; he had a particular excellence in staining marble, which he did several times for Prince *Rupert*. He died in *London* about forty-five years ago, and lies buried in *St. Martin's Church*.

**FF** ODOARDO FIALETTI *Fecit.* A painter and engraver of *Bologna*, us'd this mark.

FIDELITY is represented in painting by a woman cloathed in white, with a seal in one hand, a key in the other, and a white dog by her.

The key and seal denote fidelity, because they lock up and conceal secrets; the dog is the most faithful animal in the world, and beloved by men.

### FIELDS, HILLS, and MOUNTAINS.

1. Fields that lie near must be done with a singular good *green*, the which must always be faintest, according as they fall off to a farther distance; heightening them with *masticote* or a light *green*, and shadowing with *sap-green*, but not too much.

2. Those which lie far off are to be laid with a *French berry yellow*, made of a greenish *blue*, shaded with *oker*.

3. And in fields, hills, and dales (whether near or far off) there are many roads, passages, and ways, which must be laid either fainter or stronger, according to their distance and situation.

4. Those mountains which are next in sight are to be laid with a fair *green*, and shaded with *sap green*; sometimes with *brown oker* and *French berries*, to distinguish them from such as are far off.

5. Such as lie farther off are to be done with *green*, *blue*, and *masticote*, and shaded with *blue*, *green*, and *verdegrease*.

6. Such as lie yet farther must be laid with some strong *blue*, *white*, and *Bergh-green*, and shaded with strong *blue*.

7. Those which lie yet farther off must be done with some strong *blue*, and *white*, and shaded with *blue* only.

8. Those that lie at still a greater distance are to be laid only with *white*, and shaded with a faint *bice*.

9. Those that lie yet farther off are done with *bice* and *white*, and shaded with *bice*.

FIERCENESS is represented in painting by a young woman seeming to be besides herself, breathing out threats, laying her left hand upon a tiger's head, as if she was a going to strike, holding an oaken cudgel in her right hand in a threatening manner.

She is represented young, and therefore undaunted; her right hand upon the tiger denotes fierceness and cruelty; the oaken club signifies the hardheartedness of savage men, *Duro robore nati*.

FIGURE [*in painting, &c.*] signifies the lines and colours which form the representation of a man or other animal; thus it is said of a figure, this figure is lame, and there are fifty figures in this piece.

## FIG

But in a more immediate and peculiar manner figure is understood of human personages; thus a piece of painting is said to be full of *Figures*, when there are a great many representations of men; and a landscape wherein is nothing but trees, plants, mountains, &c. is said to be without *Figures*.

And so likewise in *sculpture*, we say *Figures* of marble, brass, plaister, stucco, &c. but chiefly of human representations, and but rarely, if ever, to other things. Thus we call a man on horseback an *equestrian Figure*.

But *Daviler* observes, that those human figures that are represented sitting, or kneeling, or laid all along, as those on monuments, &c. and rivers personify'd are more properly call'd *Figures* than statues.

FIGURES. *To colour* NAKED FIGURES, as

1. *Women and children.* Mix the best *flake white-lead* and a little good lake, and (if you please) a little vermilion; but take care that the mixture be neither too red nor too pale, but as agreeably as possibly can be to the life it self.

2. When this is dry, touch the lips, cheeks, chin, fingers and toes with thin lake, and then heighten with white mixt with a little lake or vermilion.

3. If you would cover them somewhat brownish, mix with your *carnation* a little brown *oker*; and shade it with *red oker* and coal-black with a little lake.

4. For *old women*, use *white*, *vermilion*, and *brown oker*; and where the lustre ought to be, give it with *vermilion* mixt with a little lake.

5. Give the shade with *red-oker* and lake, or with *wood-foot* or *lamp-black*; and heighten with *white*, mixt with a small quantity of *vermilion*.

6. Paint *dead children* and *young women* with *brown oker*, *white* and some *vermilion*; and shadow with the foot of wood.

7. Colour *dead old women* with brown oker mixt with a little white; shade first with a thin wood foot, and afterwards with a stronger.

8. Paint *young men* with *cerufs*, *vermilion*, and lake, making it a little browner than for young women, giving them lustre with vermilion and lake, and shadowing with *lamp black* and brown oker, and heightening with cerufs and vermilion.

9. Limn *old men* with *vermilion*, brown oker and white; shade with foot and lamp-black; heighten with vermilion, brown oker and white, and give a lustre with lake or vermilion.

10. Colour *dead men* with brown oker, white and a little vermilion, with discretion; shade with foot or lamp black, mixt with a little cerufs.



## F I L

11. Colour *devils, satyrs*, or the like with brown *oker*, mixt with a little *white* and *red*; and make this mixture, some part of it white, and some part of it browner, shading it strongly with *foot*, according to discretion.

### *To dye a deep FILLEMOT.*

For twenty-eight pounds of wool, take ten ounces of *galls*, and a pound of *fucette* or *virette wood*, half a pound of *madder*, and two ounces of *gum gutta*; boil the dye, and stir the ware in it, till the dye hath penetrated it sufficiently.

If you would have it brighter, then take but six ounces of *galls*, and six ounces of *madder*; and add a quarter of a pound of *verdegrease*.

Or else take half a pound of *fucette wood*, a quarter of a pound of *galls*, and one ounce of *madder*, and one ounce of *vitriol*.

### *To dye a FILLEMOT.*

First, let the ware be dyed *yellow*; then pass it through the hot *black* dye, and when it is cool, rinse it, always remembering that the lighter the *yellow*, the lighter will be the *Fillemot*; then having set fair water over the fire, put in half an ounce of *brasile* wood; let it boil for a quarter of an our, and then pass the ware through it.

### *To dye SILK a FILLEMOT.*

First dye the silk in the last-mentioned yellow; then for every pound of silk, take a quarter of a pound of blue *Provence* wood; boil it in a bag as usual for half an hour, in the quantity of a pail of water; take the bag out, and let the suds stand to cool, till you can just bear your hand in it; then lay the yellow silk to soak in it for a full hour; then take it out, and boil a sufficient quantity of powdered *foot* in half a pail of water for half an hour, and afterwards put in the silk. When it is taken out, let it be rinsed in a good strong lye of wood ashes, and after that in river water, and then hang it out to dry.

### *To dye a light FILLEMOT.*

Take a quarter of a pound of *galls* beaten small; boil them an hour and a half in a pail of water; then put in a quarter of a pound of *vitriol*, a handful of *foot* beaten small, and so put the yellow silks into it, till it grows dark enough; then rinse it and dry it.

### *Crimson FILLEMOT.*

Fill a well clean'd kettle half full of water, and for every pound of silk, take half a pound of yellow wood, which boil in a bag in the water for some time; then add one pound of *galls*, and fill up the kettle with stale, or old gall water; then take the silks off the poles (they having been first boil'd, alumed and rinsed) put them into the kettle, and boil them for an hour;

## F L A

hour; then soak them in the liquor a whole night, and in the morning wring them out, rinse, and beat them; and afterwards brown them a little, till they become sufficiently deep.

### *A slight FILLEMOT.*

For every pound of silk, take one pound of Fucet-wood, and half an ounce of pot ashes; boil them together, and in order to render the dye deep enough, brown it with a little black at pleasure; when the silk is deep enough dy'd, rinse and dry it.

### *To make a room seem all on FIRE.*

Take rectified spirits of wine, and dissolve *camphire* in it; evaporate this in a very close chamber, where no air can get in, and he that first shall enter the chamber with a lighted candle, will be fill'd with amazement; for the chamber will seem full of fire, and very subtil; but it will be of very short continuance.

This done in a close cup-board or press, will be much more perspicuous and visible.

### *An excellent invention to make a pleasant COAL FIRE.*

Take of the best *Newcastle*-coals pounded small three parts; loam one part; mix them well together into a mass with water; make them up into balls, and dry them well.

This fire is durable, sweet, and not offensive, by reason of the smoke or cynders, as other coal fires are; but burns as well in a chamber as charcoal it self.

### *To dye SILK of a FIRE colour.*

Alum your silk (see the article ALUM, &c. in the article CRIMSON) then tie up half a pound of *Brafle* in a bag to each pound of silk, and lay it in liquor for half an hour; then take it out, and put in an ounce of beaten *turmerick*; let the dye dissolve, and when it is cold, take out the silk, and put the bag in again with some lye; boil it again, and then take out the bag, and put in the silk, leaving it in till it is cold; then rinse it, and dry it.

### *To dye a FLAME colour.*

It being first dyed yellow, boil two ounces of *fustel-wood*, and an ounce of pot-ashes, for every pound of woollen-stuffs, for half an hour; stir it very well, and then put in the stuffs; work it till the colour is to your mind, then rinse it out.

FIRE and FLAMES [in miniature] are coloured, the lights with *masticote* and *orpiment*; and for the shades, *vermilion* and *carmine*.

### *To dye SILK a FLAME colour.*

First boil, rinse, beat and dry the silk, and for every pound, take two ounces of *Orleans*, dissolve it in warm water, and wave the silk to and fro in it till it is just ready to boil, which it

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must not be suffered to do ; then rinse and beat the filk ; and afterwards to every pound of filk, take six pounds of wild saffron, prepar'd as directed in the *Spanish* flesh colour, or in carnation, four ounces and a half of pot ashes, two quarters and a half of lime juice ; all which must be prepar'd as in the pearl and flame colour.

**A**LBERT FLAMEN in certain plates of birds, beasts, and fishes, made this mark.  
*Alexander Badiali*, a painter and engraver of *Bologna* ; and *Another Boss*, a native of *France*, also used this mark.

FLATTERY is represented in painting by a woman in an affected wanton habit, playing upon a flute ; a buck at her feet fast asleep, with a bee-hive by her side.

The buck denotes flattery, because he is so charmed with music, that he lets himself be taken ; the bees are a true emblem of it, carrying honey in their mouth, and a secret sting in their tails.

F. L. D. *Ciatres exc.* the mark of a dealer in prints.

*To dye woollen stuffs, &c. a FLESH colour.*

First boil the stuff or cloth for two hours in a liquor made with a pound of *alum*, a pound of calcin'd *tartar*, four ounces of *cerufs*, and three ounces and a half of *arsenick* ; then take it out, leaving the suds over the fire ; and the next morning prepare a liquor made with two pounds of good leather shreds, a quarter of a pound of *Orleans*, two ounces of *turmerick*, and an ounce and half of *aqua fortis*.

*Another.*

When you have a mind to dye silk, linen, or cottons with *Brafle* wood, take two ounces of *Brafle* for a pair of cotton stockings, and an ounce of galls, and also two ounces of *Brafle*, and an ounce of *alum* ; and pass them through each dye twice, till the dye becomes as clear as water, and they will be of a beautiful flesh colour, even to admiration.

*Another.*

Boil the cloth for an hour in a liquor made with three pounds and a half of *alum*, four ounces of *cerufs*, and three ounces of *arsenick* ; pour off the water, and rinse the stuff in running water, and then make a liquor of eight pounds of *madder*, and two ounces of *sal armoniack* ; let them lie a night to dissolve ; then boil them a little, adding one ounce of *pot-ashes* ; then pour some of this upon the stuff in the other kettle ; and as often as it is poured on, so often you dye, so that you may leave off when it is light dyed, or deepen it as you please ; and if you would have it very deep, mix with the *pot-ashes* an ounce and an half of *borax*, and that will also give it a beautiful lustre.

*Another*

## F L E

### *Another FLESH colour.*

For every pound of woollen, boil in a little water one ounce of *tartar*, and half a quarter of an ounce of *starch*; skim the liquor, then put in a quarter of an ounce of *cochineal*, a quarter of an ounce of *starch*, an ounce of *aqua fortis*, with a quarter of an ounce of *English tin*, and an ounce of rain water.

First make the water boil with the *tartar* and *starch*, and afterwards put in the rest of the ingredients; which boil together, and put in the ware, and boil it in the liquor for an hour, and the work is done.

### *Another.*

Boil in fair water two ounces of *white wine tartar*, *starch flour* one ounce, of juice of *lemons* as much, *cream of tartar* half an ounce, and as much *turmerick* as will lie upon the point of a knife. When these have boil'd, put in an ounce of *cochineal*, and a small time after two ounces of *aqua fortis*, in which two drams of tin hath been dissolv'd, and boil the ware an hour in this liquor.

### *A paler FLESH COLOUR.*

This dye must be made just as the last, except that there must be but half the same quantity of ingredients, and that without any galls.

### *A Spanish FLESH colour.*

For every pound of ware take two ounces of *tartar*, a quarter of an ounce of *cochineal*, a quarter of an ounce of *starch*, to which add half an ounce, when the former has been a little while in the suds.

Then having dissolved two ounces of filings of *tin* in three ounces of *aqua fortis* in the sun-shine, put the *cochineal* into the liquor by degrees; and when it boils, put in the *aqua fortis*, and a little after that, put in the goods to be dyed, adding a quarter of an ounce of *cream of tartar*, or the most subtile *tartar*, half an ounce of *starch*, half an ounce of *lemon juice*, and half an ounce of *cochineal*; boil for a quarter of an hour, or as you see occasion.

### FLESH colour, to dye.

#### *To dye an incarnate or Flesh colour in grain.*

Take stale liquor made with fair water and wheat bran, or four tap-wort, being very clear, a sufficient quantity, alum bruised two pounds and a half, red tartar bruised small one pound; boil all together, and enter twenty yards of broad cloth; boil and handle it well for three hours; after which cool your cloth, and wash it well; then take fresh bran liquor (made of a peck of bran) the clear liquor a sufficient quantity, grains of kermes four ounces dried in a pewter dish before the fire, and made into a fine powder, red argol in powder four ounces; mix all these

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three things together, and make them boil; enter your cloth, and handle it, boiling it three quarters of an hour strongly, and keeping the cloth under the liquor; then cool and wash it well.

*Another incarnate colour in grain.*

Take small beer, *alum* twenty ounces, *red tartar* eight ounces; melt or dissolve; then enter twenty yards of stuff or cloth, &c. and boil it two hours and a half; then cool; let it lie in water twenty-four hours; after which wash it well. Take fair water and small beer, of each equal parts, a sufficient quantity, *grains* in fine powder an ounce; infuse them all night, putting in also a little *wheat flour*, about an ounce; then make it ready to boil; enter your cloth.

*Another incarnate, or Flesh colour.*

First boil your cloth well in a good *alum* water; take it out, hang it up dropping, and let it dry. Take clear *bran* liquor a sufficient quantity, *cochineal* in fine powder one ounce, *tartar* half an ounce; mix and make almost a boiling heat, letting it take as little air as may be; then enter your cloth, and handle it as quick over as may be for about half an hour; after which, take it out, wash it well in cold water, and hang it up to dry.

*Another incarnate or Flesh colour, called a raspberry red.*

Take *bran* liquor a sufficient quantity, *alum* three pounds; boil for three hours; then add *madder* four pounds, *Brafle* ground four ounces, *alum* one ounce, fresh *bran* liquor a sufficient quantity; boil, and then enter twenty yards of camblet stuff, but not boiling; keep it in two hours, take it out, and wash it well.

*To dye linen or fustain of a FLESH colour.*

For every pound of linen, put two ounces of bastard or wild *saffron* in a bag, and lay it all night in the quantity of a pail of water to dissolve; throw away this water, and take another pail of water; and having taken the *saffron* out of the bag, rub it well betwixt your hands, and wring it clean out of the water; filter the liquor that none of the *saffron* be lost, and then throw it away; repeat this operation as long as the *saffron* leaves any yellow tincture, and then wring it out dry with your hands.

Then take a little lye made with good *beech ashes*, heat it, and put it to your thus prepar'd *saffron*, letting it lye and steep for five or six hours; then wring it out, and that none may remain, filter the lye through a hair sieve; then throw away the *saffron*, and add to the lye an equal quantity of beer *vinegar*; stir it about very well, and put in your pound of linen, letting it lie in the liquor for three or four hours, and then rinse it clean out, and it will be of a very good crimson *Flesh* colour

## F L E

colour; but you must take care to stir the linen often about, to prevent its being flak'd and unequally dyed.

*To dye woollen, silk, worsted, or yarn, of a FLESH colour.*

First prepare two pails full of sharp lye from a handful of *beech-ashes* twice boil'd; throw a pound of *pot-ashes* into one pail, and heat the lye in a brass-kettle; and when the ashes are dissolved, stir the liquor very well; brisk up the fire, and then put in a pound of flocks or shreds of red dyed cloth; hang the kettle over the fire; let it boil for some time, and stir it about with a stick; then fill it up with the remaining lye, scum it clear, and as it boils away for three hours, fill it up with stale urine; then pass a thread of yarn through it, and draw it thro' your finger to examine whether there are any hairs hanging to it, and if they do, put in a quarter of an ounce of *turmeric* powdered; stir it well about, and try with the thread of yarn again, whether it takes a red as you would have it.

If you would have the goods of a beautiful *orange* colour, then pour half the dye into another vat, and put the goods into it, having been before dyed yellow with broom or dyers *yellow weed*; and in the remaining part of the dye you may put the whole goods (which must not be alumed) and then cover it very close, that no steam may evaporate before it be cold.

Then put about two pails full of water into a tub, and in it rinse both the colours very well; dry them, press them, and rinse them again in spring water.

If you would have the ware of a very beautiful *Flesh* colour, hang the kettle (which must be of brass) again over the fire, boil the dye to fuds, and put in the ware, leaving it there till it is cold; then rinse it in the same water, which you have before, but take a special care that you do not mingle the orange and *Flesh* colour together.

If you would have a lighter orange colour, hang the dye again over the fire, and put in the ware that has been dyed yellow, and let it lie till it becomes cold; then rinse it, as the *Flesh* colour before.

If you would have a lighter *Flesh* colour, then boil the dye again to fuds, and put in the white ware, as before, and rinse it out; and so, if you would dye a light gold colour, &c. do it as before, and take the water wherein you have rinsed your former ware, and boil or heat it, and then put in the quantity of a pigeon's egg of *alum*; after which, put in the ware that is dyed either *blue* or *yellow*, and let it lie in it till it is cold, and then rinse it out.

## F L O

*To dye SILK FLESH colour or INCARNADINE.*

For every pound of filk, put in a quarter of a pound of *Brazil*; boil it, strain it through a sieve, and pour fresh cold water upon it. While it is warm, put in the filk, leaving it in till it hath drawn all the strength out of the dye; then rinse and dry it.

*To dye SILK the beautiful Spanish FLESH colour or CARNATION.*

First prepare and alum your filk as for *crimson*, and for every pound of filk, take four pounds of *wild saffron*, which put into a thick bag; throw it into several waters, and work it so long, till the water comes from it clear; then take the saffron out of the bag, squeeze it, and rub it with your hands till it is dry, putting it into another vessel; afterwards for every pound of filk take a quarter of a pound of pot ashes, and rub them well into the *saffron* in a clean vessel; and after that, if it be necessary, it may be rubb'd again.

When all this has been done, divide the saffron into two parts, and take a bag so thick that the pot-ashes cannot get thro', when it is tied up; put one part of the saffron into this bag, and pour clear water upon it in the kettle, till the strength of the saffron is boil'd out; then for every pound of filk, take half a pint of lime juice, and divide that also into two parts, and to each part of saffron, add one part of lime juice; then take the dry filk, and stir it up and down in the kettle, in which the loose part of the saffron is, for the space of an hour; then let it be very well wrung and pass'd thro' the kettle where the bag is, and for an hour continually stirred; then let it be wrung out and dry'd in a dark place, and not in a clear light, and it will be of the beautiful colour desired.

*To make FLOCK CLOTH hangings.*

Spread coarse canvass upon an even floor or table, and having flocks or shreds of woollen ground as small as dust, and the cloth being siz'd over with good strong size while it is wet, sift the flocks through a fine sieve, which when you have done, run a roller of wood or iron over the piece to press them down close, and so suffer them to dry in the shade, lest the sun or fire parch them, or make them crack; and when they are dry, brush them over lightly with alum water, and so draw your design with black and red-lead, charcoal black, or any other colour, and it will at a distance look like tapestry, and be very lasting in a room where no great fires are made.

FLORA, the Goddess of flowers, is represented in a black mantle.

FRANCIS



## F L O

FRANCIS FLORIS, born in the year 1520, scholar of *Lambert Lombard*, and studied *Michael Angelo*; liv'd at *Antwerp* and in *Italy*, excell'd in history, died in the year 1570, aged fifty years.

FLOWERS. It is most delightful to paint flowers, not only because of their lustre, but also because they take up but little time, and require hardly any time to do them; it is all pleasure and no trouble. You spoil a face if you make one eye a little higher than the other, if you make a small nose or a large mouth, and so on of the other features. But the fear of these proportions never troubles the mind when you are about *Flowers*, for except they be quite out of the way indeed, you spoil nothing, and accordingly most of the *Quality* who apply themselves to painting, concern themselves with nothing but *Flowers*. You must however learn to copy a little exactly; and for this branch of miniature, as well as for the rest, I refer to dame nature as your only guide; work then after natural flowers, and search for their tints and various colours upon your pallet. A little practice will easily bring you to be expert in this; and in order to pave the way for you at first, I will shew you, continuing my design, how to paint some of them; it is not always you can have natural *Flowers*, which see under their proper articles, and you may be often obliged to copy from prints, where you see nothing but graving.

### *The colouring of* FLOWERS.

1. *The corn Flower*. Let this be done with *blue* mixt with some *white*; shadow with *indigo*, and also with *blue* and *white*.

2. *The marygold* is to be done with *yellow orpiment* and *minium*; shadow with *vermilion* and *lake* mixt with *minium*, and heightened with *white* and *masticote*.

3. *The clove gilliflower or July Flower*. Do this with fine *lake* mixt with *white*; shade it with *brown lake*, and heighten it with *lake* mixt with *white*; the speckling or spotting of it is done with *lake*. Those which are lighter with a lighter red upon a pure *white*; those like flames with *vermilion* and *lake*, which shade with a stronger *lake*; and speckle the *white* with *lake* and *vermilion* to resemble the life.

Lay the green stalks or branches and leaves with *Bergh-green*, and shade with *sap-green*.

4. *The white rose* is to be done with *flake-white*; shade with *white* and *black* (but the chief shadows with a stronger *black*) and heighten with *white*.

The little *thrums* (which some call *seeds*) in the middle of the rose, lay them with *masticote*, and shadow with *minium*, and heighten with *white*.

9. *The damask rose.* Do it over with *lake* mixt with *white*; shadow with the same, mixt with thin *lake*, and heighten with *white*.

Let the *green leaves* be laid over with *verdegrease* mixt with some *French berry-green*; shade with *verdegrease* mixt with *sap-green*, and make the stalks somewhat browner with *brown oker*.

6. *Red rose.* Lay this over with fine *lake* mixt with *white*; shade it with *brown lake*, and heighten it with *lake* mixt with *white*.

7. *To colour a tulip.* Draw it first with *black-lead* upon a white ground; then shade it a little as for a white flower with thin *Indian ink*, or with *green*, *yellow ink*, or with *black-lead* ground with thick *gum-water*.

Then lay on the colours resembling nature, which being dry, shade with a higher colour, and then farther, shadow it according to the nature of the *Flower*.

So that being finish'd, it may be like *flame*, *red*, *blue lake*, *purple*, *spotted*, or otherwise, in imitation of the life.

FOLIAGE, a cluster or assemblage of flowers, leaves, branches, &c. It is particularly us'd for the representations of such flowers, leaves, branches, rinds, &c. whether natural or artificial, us'd as in enrichments on capitals, freezes, pediments, &c.

FOLIATING } Looking glass plates. The plates having  
SILVERING } been polish'd, are next to be foliated or silver'd, which is perform'd after the following manner:

A thin blotting paper is spread on a table, and sprinkled with fine chalk; and then a fine *lamina* or leaf of tin, called *foil*, is laid over the paper; upon this *mercury* is poured, which is equally to be distributed over the leaf with a hare's foot or cotton. Over the leaf is laid a clean paper, and over that the glass plate.

The glass plate is press'd down with the right hand, and the paper is drawn gently out with the left; which being done, the plate is covered with a thicker paper, and loaden with a greater weight, that the superfluous *mercury* may be driven out, and the *tin* adhere more closely to the glass.

When it is dried, the weight is removed, and the looking-glass is complete.

Some add an ounce of *mercury* to half an ounce of *marcasite* melted by the fire; and lest the *mercury* should evaporate in smoke, pour it into cold water, and when cold, squeeze it thro' a cloth or leather.

Some also add a quarter of an ounce of *lead* and *tin* to the *marcasite*, that the glass may dry the sooner.

## F O R

**FOLLY** is represented in painting by a person at man's estate, in a long black garment, laughing, riding upon a hobby horse, holding in one hand a whirligig of paste-board, and plays the fool with children, who make him twirl it by the wind.

*Folly* is only acting contrary to due decorum and the common custom of men, delighting in childish toys and things of little moment.

**FORCE of ELOQUENCE** is represented in painting by a woman in a decent grave habit, holding *Mercury's* rod in her hand; a lion under her feet.

This demonstrates, that force and strength give place to the eloquence of those whose tongues are well hung; for we perceive the unruly mob, though threatening destruction, are presently appeased, and lay down their arms so soon as they hear a grave eloquent person demonstrate the danger of the riot, and their boisterous huzza's are all on a sudden hushed into silence, and they tamely submit to his dictates.

**FORCE of JUSTICE** is represented in painting by a lady in royal apparel, crowned, about to sit down upon the back of a lion, and seems to lay her hand upon her sword, which denotes justice, as the lion does strength; so that the strength of the latter submits to the former, *i. e.* justice.

**FORCE of LOVE** is represented in painting by a naked stripling, resembling *Cupid* smiling, with wings on his shoulders, holding a dolphin in one hand, and a garland of flowers in the other, to shew the power of love both by sea and land through the universe.

The empire of *Cupid* is sometimes imitated by his sitting in a chariot, drawn by two lions, with his hand held up towards heaven, from whence fall arrows and flames that give place to none, for *Jupiter* is not exempt from them.

**FORCE of VIRTUE** is represented in painting by a very handsome young man, called *Bellerophon*, mounted upon *Pegasus*, who with a spear kills a chimera which allegorically signifies a certain multiform variety of vices. The etymology of his name denotes a killer of vice.

**FORE-SHORTENING** in drawing, signifies the drawing a thing as it appears to the eye, and not every part to its full length and proportion; but to make those parts shorter whose full length and bigness is hid from our sight.

As if you would draw an horse standing fore-right, looking, as it were, full in your face, you must of necessity *Fore-shorten* his hinder parts, because his sides and flanks do not appear to you in their full latitude.

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In like manner, if you were to draw a ship situated fore-right, there can appear to you only her fore-part, the rest being hid from your sight, and therefore must not be express'd.

Wherefore you must observe this rule always, rather to observe the visible proportion of things than their proper and natural by measure; for the eye and understanding together, being directed by the art of perspective ought to be the guide and measure to judge of drawing and painting.

Observe therefore in all *Fore-shortenings*, that there must be a proportion observ'd, according to the judgment of the eye, that what limbs do appear may agree in proportion, as well as *Fore-shortening*.

Nothing must be express'd in drawing, but what will accord with nature in every point, as if you were to draw a man turning his head over his shoulder, you must not make him turn or wind more than nature will permit, nor must any other action be forced beyond the bounds of nature, nor must any thing come short of it; but though nature is not to be strain'd beyond its bounds, yet it should be express'd to the highest pitch.

So if you were to express a man in any violent action, as fighting, either striking or endeavouring to avoid the stroke; or as in running or wrestling or leaping, or any other violent action, you must not express any of these in a posture that cannot agree with the motion of nature, and that a man cannot imitate with his body, and the like as to all things else; for nature must be the parent and pattern of all kinds of draughts.

### *Of drawing a FORERIGHT naked figure.*

To draw a good naked figure very well is one of the most difficult performances in painting, because it cannot be done well without understanding anatomy.

In doing this, first strike a line perpendicular as long as you design the figure, and then divide that line into so many divisions or parts, as you design the proportion; the common or ordinary proportion is eight measures or *heads*, whereof the *head* is reckoned one of the eight. See the articles HEADS, FACES, PROPORTIONS, MEASURES, &c.

Always begin with the *head* first, because the body is always proportioned to the head; then divide the head into four equal parts, the first for the *hair*; the second for the *forehead*; the third for the *nose*; the fourth for the *mouth* and *chin*.

But a painter is not bound exactly to this rule when he draws to the life; because these rules were intended for no other use than to create the *idea* of such and such proportions first in our brain, and to prevent drawing in an extravagant and preposterous proportion. For faces differ one from another, some have long noses, others short, some an high forehead, others a low one; the

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the distance betwixt the nose and chin is longer in some than in others.

Then having sketch'd out the line and fram'd the head, proceed downwards, and one head's length from the chin you draw the breasts, the third reacheth to the navel, the fourth to the privities, the fifth to the middle of the thigh, the sixth to the lower part of the knee, the seventh to the small of the leg, and the eighth to the sole of the foot.

Observe to draw the shoulders at the extremities or broadest part to be two heads and an half broad, the breadth of the hips to be but the distance of two heads, the arm to be six measures of the head long; but if you reckon the breasts in, they make eight, when the arms are extended out.

Also take notice that when the arm hangs down, it reaches within a span of the knee.

In proceeding downwards, take care to place all the muscles in their right and proper places according to nature, as they are observ'd in the life; for there are no certain rules for the placing them.

Therefore it will be very advantageous to draw very much after the life, and after good prints of anatomy and statues, and anatomies of plaister of *Paris*, which is the only way to arrive at the drawing a naked figure well.

FORTUNE is represented in painting by a naked woman, having an ensign or veil over-shadowing her, standing upon a globe or ball.

*Lactantius* says, that fortune is a vain, idle and senseless name, shewing forth man's weakness in attributing any thing thereto; which *Tully* confirms, when he says, that this name of fortune was first brought in to cover the ignorance of man.

*Pausanias* says, that her most ancient form was that which *Bupalus* made in *Greece* in shape of a woman, upon whose head was a round ball, and in one of her hands a *cornucopia*; she is call'd the blind goddess and partial lady, by reason of the bestowing of her unconstant and mutable favours.

*Macrobius* says, she was first set forth with wings on her shoulders (to shew that she was always at hand among men) and had by her side the rudder of a ship, to shew that she rules and commands; she herself being plac'd upon a wheel, holding in her right-hand a golden ball, and in the other a whip, shewing where she smil'd wealth and honour; and where she frown'd crosses and misery should follow.

In *Ægypt* she was depicted like a lady turning a great glass wheel, on whose top were many men playing; others climbing up, and others having attain'd it precipitating themselves and falling down again.

## F O U

GOOD FORTUNE is represented in painting, by a woman about to sit down, leaning her right arm upon a wheel, instead of the celestial globe ; and holding a *cornucopia* in her left-hand.

As the wheel is sometimes up and sometimes down, so fortune changes. The *cornucopia* denotes her being a disposer of the riches and good things of this world ; and the wheel being continually in motion, shews fortune is fickle and ever and anon changes, sometimes abasing one and exalting another.

F. P. signifies *Francis Primaticcio* or *Francisco Parmagiano*, who sometimes put an F only in his wooden cuts, engraven with three tools.

F. P. I. V. *Bonafius*. These letters are found in a *Madonna* of *Francesco Primaticcio*, engrav'd by *Julio Romano*.

BAPTISTA FRANCE, a *Venetian*, scholar of *Michael Angelo*, liv'd at *Rome*, *Florence* and *Venice*, excell'd in history painting, died in the year 1561.

FOUNDERY is the art of melting and casting all sorts of metals, particularly brass, iron, &c.

The FOUNDERY of small works or the manner of casting in sand.

The sand us'd by *Founders* in casting of brass, copper, &c. is of a yellowish colour, pretty soft and greasy ; but having been once us'd becomes black, by reason of the charcoal dust us'd in the moulds.

Every time this sand is us'd, it is wrought and tew'd several times over in a board about a foot square, plac'd over a kind of trunk or box into which it may fall from off the board.

This tewing is perform'd with a roller or cylinder, about two foot in length, and two inches in diameter, and a sort of knife made of the blade of a sword ; with these two instruments they alternatively roll and cut the sand, and at length turn it down into the box underneath.

Then they take a wooden board or table of a length and breadth proportionable to the quantity of things to be cast ; round which they put a frame or ledge, and thus make a sort of mould.

This mould is fill'd with the sand before prepar'd, and a little moistened.

When this has been done, they take models or patterns (either of wood or metal) of the things they would cast, and these they apply on the mould pressing them down into the sand so as to leave their form indented.

Along the middle of the mould is laid half a little cylinder of brass, which is to be the master jet or canal for running the metal ; being so dispos'd as to touch the ledge at one side, and only to reach to the last pattern on the other.

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From this are plac'd several lesser jets or branches reaching to each pattern, whereby the metal is convey'd through the whole frame.

Having thus finish'd the first frame, they turn it upside down to take out the patterns from the sand, in order to which they first loosen them a little all round, with a small cutting instrument.

The counter-part or other half of the mould is done after the same manner, with the same patterns in a mould exactly like the former, excepting that it has pins, that entering the holes answer to them in the other case, that when the two are join'd together, the two cavities of the pattern fall exactly on each other.

The frame having been thus moulded, is carried to the melter or foundry; who after enlarging the principal jet of the canal of the counter-part with a kind of knife, and adding the cross jets, or canals to the several patterns to both, and sprinkling them over with mill-dust, sets them to dry in a furnace.

When both parts of the mould are sufficiently dry'd, they are both join'd together by the means of pins; and to prevent their starting or slipping aside by the force of the metal which is to be pour'd in flaming hot, through a hole contriv'd at the master jet, they are lock'd in a kind of press, either with screws, or with wedges, if the mould be too big.

The moulds having been thus set into the press, are rang'd near the furnace to be in readiness to receive the metal, as it comes out of the crucible.

While they are thus preparing the moulds, the metal is put in fusion in an earthen crucible, about ten inches high and four in diameter.

The furnace in which the metal is set for fusion, is much like a smith's forge, having like that a chimney to carry off the smoke, a pair of bellows to blow up the fire, and a massive or hearth where the fire is made which chiefly distinguishes the furnace from the forge.

In the middle of it is a square cavity, ten or twelve inches wide, which goes to the very bottom. It is divided into two by an iron-grate, the upper partition serves to hold the crucible and the fuel, and the lower to receive the ashes.

The fuel is to be dry wood, which when it is well lighted the crucible full of metal is set into the middle of it, and covered with an earthen cover; and a tile is laid over part of the aperture or cavity of the furnace, to increase the force of the fire beside blowing it up with the bellows.

When the metal is brought to a *fluor*, i. e. to be melted, they fill the crucible with pieces of brass, beaten in a mortar  
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putting them in with a kind of iron ladle, having a long shank at the end, form'd into a kind of hollow cylinder, out of which the ball is dropt.

The metal being all melted, the crucible is taken out of the fire by a pair of iron tongs (the feet of which are bent the better to embrace the top of the crucible) to the mould, into which he pours it, by the hole answering to the master jet of each mould.

And thus goes on from one to another, till his crucible is emptied, or there is not matter enough left for another mould.

Then casting cold water on the moulds, the frames are taken out of the presses, and the cast-works out of the sand which is work'd up again for another casting.

Then they cut off the jets, and deliver the work to other persons, who finish it.

### *The CASTING of Statues, &c.*

The art of casting statues in brass is very ancient; inso-much that its origin was so remote and obscure, that *Pliny*, an author admirably skill'd in discovering the inventors of other arts, could not discover it.

All that we can learn for certain is, that it was practis'd in its perfection first among the *Greeks*, and afterwards among the *Romans*; and that the number of statues consecrated to the Gods and hero's, surpass'd all belief.

This taste for statues was carried to such a pitch, that it became a proverb, that in *Rome* the people of brass were more numerous than the *Roman* people.

Among us, the casting of statues was but little known or practis'd before the seventeenth century.

### *The method of CASTING statues or figures.*

There are three things chiefly requir'd in casting of statues, busts, *basso relievo's*, vases and other works of sculpture.

The *mould* or *core* (so call'd of *cœur* the heart in *French*, as being the heart or middle of the statue) is a rude, lumpish figure, a little resembling the statue design'd to be cast.

It is rais'd on an iron-grate strong enough to bear it, and is strengthened on the inside with several bars or ribs of iron.

It may be made indifferently of two sorts of matter, as the work-man pleases, *viz.* potter's earth mixt up with horse dung and hair; or of plaister of *Paris* mixt with fine brick-duft.

The use of these moulds in statues is to lessen their weight, and save the expence of metal. In bells it takes up all the inside, and it preserves the vacant space where the clapper is hung.

In great guns it forms the whole barrel from the mouth to the breech, and in mortars the barrel and chamber.

The *wax* is a representation of the statue design'd in wax.

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If it be a piece of sculpture, the wax must be all of the sculptor's own hand, who usually fashions it on the mould itself.

It may be wrought apart in cavities moulded or form'd on a model, and afterwards dispos'd and arrang'd on the ribs of iron over the grate as before; filling the vacant space in the middle with liquid plaister and brick-dust; by which means the mould or core is form'd in proportion as the sculptor carries on the wax.

When the wax (which is to be the intended thickness of the metal) is finish'd, there are little waxen tubes fitted perpendicularly to it, from top to bottom, to serve both as jets for the conveyance of the metal to all parts of the work, and as vent holes to give passage to the air, which would otherwise occasion great disorder, when the hot metal came to encompass it.

The weight of the metal, that the figure will take up, is adjusted by the weight of the wax; ten pounds of metal being allow'd to one pound of wax.

The work now wants nothing but its shell, with which it is to be cover'd, and this is a kind of crust or coat laid over the wax, and which being of a soft matter and even at first liquid, easily takes and preserves the impression of every part of it, which it afterwards communicates to the metal; upon its taking the place of the wax between the shell and the mould.

The matter of this outward shell or cover is varied, according as the different lays or *strata* are apply'd.

The first is a composition of putty and old crucibles well ground and sifted, and work'd up with water to the consistence of a colour fit for painting.

Accordingly it is apply'd with a pencil, laying it seven or eight times over; letting it dry betwixt whiles.

For the second coating they lay horses dung, and natural earth to the former composition, and the third impression is only horses dung and earth.

Lastly, the shell is finish'd by laying on several more coats or impressions of this last matter, rendred very thick with the hand.

The shell being thus finish'd is strengthened and secur'd by several bands or girts of iron wound round it at half a foot distance from each other, and fastened at the bottom to the grate under the statue, and at top to a circle of iron where they all terminate.

Here it is to observ'd, that if the statue be too big, that it will not be easy to move the mould when thus provided, it must be wrought upon the spot where it is to be cast.

This may be perform'd two ways; the first is by digging a square hole in the ground, much larger than the mould that is  
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to be made in it; and the walls of it must be lin'd with free-stone or brick.

At the bottom must be a hole of the same materials with a kind of furnace, whose aperture must be outward.

In this a fire must be lighted to dry the mould and afterwards to melt the max.

Over this furnace is plac'd the grate, and on this the mould, &c. frame as is above shewn.

In the last place, at one of the edges of the square pit another large furnace is to be made for melting the metal, as hereafter mentioned.

In the other method, it is sufficient to work the mould above ground; but with the same precaution of a furnace and a grate underneath.

When this has been finish'd, four walls are to be run up, and by the side thereof a massive made for a melting furnace.

As for the rest the method is the same in both.

The mould being finish'd and inclos'd between four walls, whether under ground or above it; a moderate fire must be lighted under it, and the hole cover'd with planks, that the wax may melt gently down, and run out at pipes contriv'd for that purpose at the foot of the mould, which are afterwards to be very exactly clos'd with earth, as soon as all the wax is carried off.

When this is done, the hole is fill'd up with bricks thrown in at random, and the fire in the furnace augmented, till such time as both the bricks and the mould become red hot; which usually happens in twenty four hours time.

Then the fire being extinguish'd, and every thing cold again, the bricks are taken out, and their place is fill'd with earth moistened and a little beaten to the top of the mould, in order to render it the more firm and steady.

Matters being carried on thus far, nothing now remains to be done, but to melt the metal and run it into the mould.

This is done by the furnace above, which is made in the manner of an oven, with three openings; one to put in the wood, another for a vent, and a third for the metal to run out at.

This last aperture or opening, which is kept very close, all the while the metal is melting, a little tube or canal is laid, by which the melted metal is convey'd into a large earthen bason over the mould, into the bottom of which all the big branches of the jets, which are to carry the metal into all the parts of the mould, are inserted.

These jets are all terminated or stopt with a kind of plugs which are kept close, that upon the opening of the furnace, the brass  
which

which gushes out like a torrent of fire, may not enter any of them, till the bason be full enough of matter to enter them all at once.

Upon which occasion they pull out the plugs, which are long iron rods with a head at one end, capable of filling the whole diameter of each tube.

The hole of the furnace is opened with a long piece of iron fitted at the end of each pole ; and the mould filled in an instant.

The work being now finish'd, at least so much as belongs to the *casting* ; what remains is the business of the sculptor or carver, who taking the figure out of the mould and earth with which it is encompass'd, saws off the jets with which it appears cover'd over, and repairs it with instruments proper to his art, as chissels, gravers, puncheons and the like.

FRAUD is represented in painting, by a woman with two faces, one young and the other old ; feet like eagle's talons, a tail like a scorpion ; two hearts in her right hand, and a mask in her left.

The two faces denote fraud and deceit, ever pretending well, the two hearts the two appearances ; the mask intimates that fraud makes things appear otherwise than they are, and the base designs and discord, they foment, like birds of prey to rob men of their goods and honour.

JOHN FREEMAN was a good history painter in the reign of King *Charles II*, he was thought to have been poisoned in the *West Indies*, but he returned to *England*, and died here ; yet his genius was so much impaired by that attempt on his life, that his latter works fail'd of their usual perfection ; he was look'd upon as a rival to Mr. *Fuller* ; insomuch that his brother Colonel *Freeman* offered to lay a wager of 100 *l.* that he would draw a figure with that master ; which challenge, but for what reason I know not, was never accepted.

Mr. *Freeman* was in his drawings, especially in the academy, most extraordinary, and equal to any of our modern masters. He was in his latter days scene painter to the play-house in *Covent-Garden*, where many of his works are still to be seen.

FREE-WILL is represented by a man of juvenile years, cloath'd in a royal habit of divers colours, crown'd, and a scepter in his hand, on the top of which is the *Greek* letter  $\chi$ .

He is young because discretion is requisite to attain. The habit, crown and scepter determine his absolute power ; the divers colours, his not being determin'd ; and that he can act by divers means. The Letter  $\chi$  declares the two ways of man's life, virtue and vice as the  $\chi$  is divided at the top.



AGNES FREJI, wife of *Albert Durer*, us'd this mark on several little plates, engrav'd by her, representing our Saviour's mysteries, or else some scholar of his.

**FRESCO.** A method of painting or rather plastering on walls to endure the weather, and representing birds, beasts, herbs, fruits, &c. in relief.

It is perform'd on fresh plaster, or on a wall laid with mortar, not yet dry, and with water colours.

This sort of painting has a great advantage by its incorporating with the moisture, and drying along with it, it is rendred extreme durable, and never fails or falls, but along with it.

As to the method of this painting, it is as follows.

The plaster must be made of well wash'd lime, mixt with fine powder of old rubbish stones; the lime must be so often wash'd, till all its salt is abstracted, and all the work must be done in clear dry weather; or it may be mixt well with well burnt flints.

And in order to render the plaster more durable, they strike into the joints of the brick or stone walls, stumps of horse nails at about six inches distance from each other, to prevent the plaster from peeling off.

With this plaster the wall is first to be plastered a good thickness, and left some time to dry; the design and colours being first ready prepar'd.

This painting is chiefly perform'd on walls and vaults, newly plastered with lime and sand; but plaster must only be laid in proportion as the painting goes on, no more being to be done at once than the painter can dispatch in a day, while it is moist.

Before the painting is begun, there is usually a cartoon or design made of paper to be calk'd and transferr'd to the wall, about half an hour after the plaster has been laid on.

The colour being prepar'd and mingled, the wall is to be plastered over again the second time about the thickness of a half crown; but only so much as you intend presently to work upon, and while it is wet, you must work the colours therein, which will mix and incorporate with the plaster, so as never to wash out.

The painting must be, for the work to come out in all its beauty, wrought quick, and with a free hand, for there can be no mending or alteration after the first painting, and therefore make your colour high enough at first; yet you may deepen, but not easily lighten.

Nor must they ever be retouch'd dry, with colours mixt up with the white of an egg or size or gum, as some workmen do,

do, by reason that such colours grow blackish; nor do any preserve themselves, but such as were laid on hastily at first.

In this painting all the compound and artificial colours, and almost all the minerals are set aside, and scarce any thing us'd but earths; which are capable of preserving their colour, defending it from the burning of the lime, and resisting its salt, which *Vitruvius* calls its bitterness.

The colours us'd are white made of lime flak'd long ago, and white marble dust, oker both red and yellow, violet, red-verditer, *lapis lazuli*, black, *Spanish* brown, *Spanish* white, &c. all which are only ground and work'd up with *lime-water*, *milk* or *whey*, and most of them grow brighter and brighter as the *Fresco* dries.

The brushes and pencils for this work, must be long and soft, or else they will rake and raze the painting.

The colours must be full and flowing from the brush; the design perfect in the image or paper copy, for in this work you cannot alter or add upon any colour.

This sort of painting has a great advantage, by its incorporating with the mortar, and drying along with it, it is rendred extremely durable, and never fails nor falls, but along with it. The ancients painted on *stuck*, and it is worthy observation in *Vitruvius*, what infinite care they took in making the incrustation or plastering of their buildings, to render them durable and beautiful.

Though the modern painters find a plaster made of lime and sand, preferable to *stuck*, both because it does not dry too fast, and as being a little brownish, it is fitter to lay colours on, than a ground so white as *stuck*.

This kind of painting was the ancient *Grecian* way of painting, and afterwards was much us'd by the *Romans*.

*Plutarch* informs us, that *Aratas* the great commander under *Ptolemy* King of *Egypt* (in a compliment to the Emperor's affections that way) forbore to sack a wealthy city, merely for the excellency of the *Fresco* painting upon the walls of the houses.

There have been several whole towns of this work in *Germany*, excellently well done; but now ruin'd by the wars.

At *Rome* there are three chambers (in the *Popes* palace) of *Fresco* done by *Raphael Urbin*, and *Julio Romano* (his disciple) who finish'd his master's work; which is yet call'd *Raphael's* design.

There are other places done by *Andrea del Sexto* or *Sarto* and *Michael Angelo*, and some other artists.

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There is also an excellent *Fresco* work at *Fontainbleau* in *France*. It is the continued travels of *Ulysses* in sixty pieces, done by *Bolleme Martin Rouse*, a *Florentine* and others.

*The colours used in Fresco.*

*White* is made of old lime and white marble dust, near as much of the one as the other; sometimes a fourth part of the white marble dust will do, which depends on the quality of the lime, and is found but only in practice.

If there be too much marble the *white* will grow blackish.

*Ooker*, a brownish-red is a natural earth.

*Oker* yellow is a natural earth, which turns red by burning.

*Yellow-dark* or *ruth oker* is also a natural and slimy earth, and is taken up in the water in iron-mines; when it is calcin'd, it takes a fine colour.

*Yellow of Naples*, is a kind of slime which gathers about sulphur mines, and though it is made use of in *Fresco*, it is not of so good a colour, as that which is made of *earth* or *yellow oker* with *white*.

*Red-oker* is a natural earth found in *England*, and serves instead of *lake*.

The ancients had a colour which is now lost, it was as lively as *lake*; for in *Titus's* baths at *Rome*, there is a chamber, where there still remains in the ceiling some ornamental works in stucc, enrich'd with bands of gold azure and a red, which seem to be *lake*.

*Earth-green* of *Verona* in *Lombardy*, is a natural earth hard and dark.

*Earth-green*, another that is lighter.

*Lapis lazuli* is a very hard stone, and difficult to be prepar'd; 'tis calcin'd in the fire, then pounded very small in a mortar, mixt with *wax* and *rosin*, of which a sort of paste is made, which is moulded and wash'd in clean water, what comes out first is best; and its beauty diminishes till it is reduce'd to a gravel like lees. This colour subsists and keeps better than any other. It is to be tempered on the pallet, when us'd with oil and not ground. But this being very dear may be spared in *Fresco*, where *amel* has the same effect, especially in ceilings.

*Amel* is a blue colour, has a little body; 'tis us'd in great landscapes; it must be calcinated in an iron-box, to make it the more brown and beautiful.

*Earth of Cologne* is a russet-black, apt to turn red.

There is another earth of *Germany*, which is a natural earth with a bluish cast, like the black of a coal; printers make use of this black.

There



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There is another *black* us'd, made of the lees of burnt wine, which the *Italians* call *fescia da Botta*.

These are the best colours for painting in *Fresco*.

All those that are natural earths are good; they are ground and tempered with water.

Before the painter sets to work, he prepares all the chief tints, and puts them into separate earthen pots.

It must be observ'd, that all the colours brighten as they grow dry, except *red-varnish* which the *Italians* call *pavonazzo*; the *brownish red-oker*, *ruth-oker*, and the *blacks*, particularly those that pass through the fire.

The painters generally try their colours on a dry smooth tile; for the tile presently imbibing all that is moist in them, and drying them, they see by it, what effect they will have when us'd.

CHARLES ALPHONSE *de Fresnoy*, born in the year 1611, scholar of *Perrier* and *Vouet*, liv'd at *Rome*, excell'd in history, died in the year 1665, aged fifty four.

FRIGHT is represented in painting, by a man with a frightful aspect, in armour, with a drawn sword in his right hand, in a threatening posture, in his left he holds *Medusa's* head.

His aspect and arms inspire fear, and his threats terrify; *Medusa's* head denote fears.

FRIT is the matter or ingredient, whereof glass is to

FRITT be made, calcin'd or bak'd in a furnace. See GLASS.

*Frit* is a salt drawn from the ashes of the plant *kali*, or from fern, which mix'd with sand or flints and bak'd together, make an opake mass.

*Pliny* describes flint to be a fine sand from the *Volturnian* sea, mix'd with three times the quantity of nitre, which being melted makes a mass call'd *ammonitrum*, which reboil'd makes pure glass.

*Neri* observes, that *Frit* is only the calx of the materials that make glass; which though they might be melted, and glass made without thus calcining them, yet it would take up much more time.

This calcining or making of *Frit*, serves for mixing and incorporating the metals together, and evaporating all the superfluous humidity.

There are three kinds of *Frits*; the first is *crystal Frit* or that for crystal metal, made with salt of *polverine* and sand.

The second and ordinary *Frit* is made of the bare ashes of *polverine* or *barillia*, without extracting the salt from them. This makes the ordinary white or crystal metal.

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The *third* is *Frit* for green glasses, made of common ashes without any preparation. This *last Frit* will require ten or twelve hours baking.

The materials us'd in each are to be reduc'd into a fine powder, wash'd and searced; then equally mix'd, and frequently stirr'd together in the melting pot. See GLASS.

*The way to make Frit for crystal.*

The name *Frit* is generally known in all glass-houses, for the first preparation of matter to make glass and crystal, which is made in the first oven call'd calcar.

To seek the etymology of it, will not be necessary to our present purpose, it is apply'd to the drying the matters in this furnace, where they are reduc'd into great and little lumps.

We think it sufficient to say, that to make fine and perfect crystal, there must be had matter fusile and capable of being rendered white and transparent in the fire.

We have already told you, that salt is the first and principal matter for this work, here we will add, that the next, and which gives glass its consistence, body or hardness, is sand or some sorts of stones, just as copper gives consistence to *Roman*, *Dantzick* and *Hungarian vitriol* and others; which would otherwise run into water in moist places.

Whence it comes to pass, that the clearest and most transparent glass, made of the finest and most pure salt, will dissolve in earth or in moist or cool places, if there be more salt in proportion than *sand* or *tarso*, by a separation natural to those two matters; it is for this reason, that some assert, that putting poison extracted out of minerals into *Venice* glass, the great cold of it will dissolve the glass.

All this depends upon the composition of the *Frit*, wherein the quantities of *salt* and *tarso* ought to be rightly proportioned to one another, to make the glass more or less fixed.

Several authors have given the name *tarso* to all matters, which give consistence to glass when they are calcin'd.

*Agricola* in his twelfth book says, that white stones when melted, are the best ingredients in this art; for this reason, they ought rather to be employed than any others for making crystal. *Pliny* says, that authors affirm, that the stones in *India* glass is made so excellently transparent, that no other is comparable to it.

The *Venetians*, who make glass in the *Isle of Muran* as well as those in *Italy*, make use of a white *flint*, which they have out of the river *Ticinus*; where there is abundance of them, as also in the river *Arnus*, both above and below *Florence*, and in other places.

They

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They use also a rich *sand* full of *salt*, which they find in *Tuscany* and in the *Vale of Arnus*, as also a sort of hard white *marble*, which is found in *Tuscany* known to every body; it grows at the foot of the little mountains *Pisa* or *Saravavezza*, *Massa* or *Carrara*, that ought to be chosen, which is very white; which has no black veins, nor yellow or red stains in it.

Of all of these materials may be made very white *tarso*, and also very fine glass and crystal.

*Ferrandus Imperatus*, l. 24. c. 16. makes mention of *Quocoli*, and thus speaks of it. The *glass-stone* is like in appearance to white *marble*, being somewhat transparent, but hard as a flint; whence being struck, it will sparkle and put into the fire turns not to lime; that it is of a light green like the serpentine stone, having veins like *Venice talk*, that being cast into a fire, it ceases to be transparent, and becomes light and more white, and more light, and at length is converted into glass.

It is certain, that all white and transparent *stones*, such as will not become *lime*, are very fit for making glass; that all fire *stones*, and those which strike fire when they are calcin'd and reduc'd to an impalpable powder, and sifted through a very fine sieve, make an incomparable pure and fine crystal; and all the art consists in reducing the *tarso* to such fine impalpable powder, but the great trouble in doing it, has made the glass men give it over.

They make use now a-days, much more of *sand* than of flints, because there is little or no expence in its preparation, which only consists in washing it clean, and afterwards drying it and sifting it before you use it, and that is all; this is the first matter or ingredient for making glass; but flints being found better and more fine, they afterwards made use of them, nothing but the parsimony and covetousness of the times had brought the other in use again; because glasses made of that may be afforded cheaper.

Crystal requires a soft and white *sand*, common glass one more rough, hard and grating like a file; *sands* differ very much from one another, for some will melt quickly, and mixing with the *salt* immediately be converted into glass; others again will endure a strong fire, but in general there is no *sand*, but what may be made into glass.

To make *Frit*, you must have two hundred pounds of *tarso*, prepared as we have shewn, or fine *sand*, and mix therewith about one hundred and thirty pounds of *salt*, also prepared after the manner elsewhere mentioned. See TARSO.

Care must be taken to mix the two materials well together, then to put them into the furnace to be calcin'd, after it has been well-heated to make the *Frit*.

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During the first hour, the fire must be moderate, and the *Frit* continually stirred with an iron-rake, that the materials may the better incorporate; then the fire must be increased to a very strong heat for the space of five hours, continuing always stirring the *Frit* with the rake, which is very necessary to the preparation of it.

After the space of five hours the *Frit* (having had sufficient fire) will be made and reduc'd to lumps about the bigness of a filbert, which (if it be enough) in breaking will be light and white without any yellow; for if you find any of that, you must put it into the furnace again, till it lose that yellow colour which it will infallibly do.

By how much the more the materials are stirred and calcin'd in the furnace, they will be so much the more refin'd, and melt more easily in the pots; after this you take it out of the furnace, and let it cool; then you lay it on boards in a dry place, otherwise the moisture would cause the *salt* to melt into water, and only the *tarso* would remain behind, which of itself would never be made into glass.

After this you cover it well for fear of dust, for you must take a great deal of care and caution to have a fine crystal.

The *Frit* thus made, ought to be as white as snow, but during the time it is making, you must try whether the quantities are well proportioned or not, which must be done by putting some of the *Frit* into a crucible, and afterwards on a clean piece of glass; where it may be seen whether it be well made by its joining together, and being clear, if it be too hard or too soft, you must increase or diminish the quantity of *salt* in it; which those experienced in the art, know very well how to do at first sight; this being well prepared and kept in a dry place, will last three or four months; nay, it will grow better and more fit to unite together speedily.

*The way of making ordinary FRIT of pulverine rochetta or barillia of Spain.*

FRIT is nothing but a calcination of the materials mixt together which make *glass*.

Although those materials would melt and be converted into *glass*, without this calcination, yet use and reason have dictated this way, since otherwise it would take up a great deal both of time and labour.

To avoid which this way of calcining the materials in furnaces was found out, which being rightly made, and the doses in the composition of it justly observ'd, it may immediately be put into the pot to be clarified before it is wrought.

*Frit* made of *pulverine* makes ordinary white-glass, and that which is made of *rochetta* of the *Levant*, makes a very fair crystal;

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stal; and that which is made of *barillia* of *Spain*, makes a glass not so white and fair, being commonly somewhat unctuous, which makes the glass incline to an azure or blueish colour.

To one hundred pounds of *barillia*, you may put eighty five or ninety pounds of fine *tarso* (See *TARSO*) and you must regulate that dose according to the goodness and fatness of the *Barillia*, which experience will teach you.

Then you must mix six or eight pounds of good *sand* with the dose, after having well wash'd, dry'd and sifted it, and of the whole you make a *Frit*, which will produce a very white and fair glass.

This *Frit* being calcin'd in the *furnace*, you must take it out hot, and throw upon it three or four pails of cold water; and then put it in a moist and cold place, after which you must from time to time sprinkle it with a small *lee* for the space of three months, which will render it as hard as stone. So that you cannot break it without a hammer; this frit will melt easily, and makes a very white glass almost like crystal, but easier to work.

The *lees*, which communicate to it their salt, work this effect, and augment the *Frit*; if the *lees* should fall short, or you have none, you may water it with common water, which although it is not so strong as the *lee*, yet it is useful.

To make this small *lee*, you must use the earthy parts or *fæces*, which settle in your earthen pots; when you make strong *lees*, as follows.

You must fill the same vessels with common water a little heated, and let it stand therein, long enough to extract the *salt* that remains; afterwards you take out that water gently with an iron-ladle, without troubling the *fæces*, and filter it, to clarify it, and afterwards let it stand some time to settle, and then keep it for the use abovesaid.

These *lees* will be still pretty sharp and full of *salt*, communicate it to the *Frit* in watering it, and by this means none will be lost.

It is true in our modern times, wherein workmen rather seek to abbreviate than embellish their work, there are but very few that take the pains to water their *Frit* after this manner. Yet as that *Frit* is the finest, most fruitful and most easy to melt, we thought it worth while to propose it.

### FRUITS, ROOTS, &c. to colour.

*Apples.* Colour with a thin *masticote* mixt with *verdegrease*; shade with brown oker, and give their blush with a thin or deep lake (resembling nature) and heighten with white.

If you would have them very high coloured, mix your white with some *masticote*; but this must be according to the condition

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tion of the fruit, whether ripe or unripe, red, yellow, or green, &c.

*Cabbage white.* Do over with very thin *yellow*, and in some places with very thin *green* (or yellowish green) sweetening with very thin brown *oker*, mixt with *sap-green*; heighten with pure *white*.

*Cabbage red.* Lay with *purple*; shade with *lake*, and heighten with *purple* mixt with *white*.

*Cherries.* With *vermilion* and some *brasil*; shade with *lake*; heighten with *vermilion* mixt with *white*.

*Heart cherries.* Colour in the middle with *vermilion* and *lake* mixt with *white*, the circumference remaining whitish, here and there sweetening them with *lake*, and heightening with *white*, mixt with a little *lake*.

*Cucumbers.* Colour the ends with a thin *yellow*, the middle with *green*, sweetening the one into the other; and shading with *sap-green*, but the whole fruit with brown *oker*; lay the specks to the life with *red* and *black*.

*Red and blue grapes.* Colour with *purple*, shaded with *blue*, and heightened with *white*.

*White grapes.* Colour with thin *verdigrease* (which is call'd *Spanish green*) mixt with *masticote*; shadow with thin *verdigrease*, and heighten with *masticote* mixt with *white*.

*Melons yellow.* Colour with *yellow*, shaded with brown *oker*, the veins with stronger brown *oker*, and then heightened with *white*.

*Green Melons.* Do with *Indigo* mixt with *verdegrease* and *sap-green*, sweetened the one into the other, and shaded with *sap-green*, but the whole fruit with brown *oker*; lay the specks with *red* and *black* to the life.

*Mulberries.* Colour with a very strong *Brasil*, and lay them over with *black*, so that between the stalks and berries they may look a little reddish, according to nature.

*Peaches.* Colour them with thin *masticote*, shaded with brown *oker*; give them a blush with *lake*, and heighten them with *white*.

*Pears.* Do over with *masticote*, shaded sweetly with brown *oker*, and give them a blush with a thin deep *lake* (resembling nature) and heighten with *white*.

*Blue plumbs.* Colour with *purple* shadowed with *bice*, and about the stalks with a little *green*, well sweetened; heighten with *purple* and *white*.

*White plumbs.* Do over with thin *masticote*, shaded with brown *oker*, and give them a blush with *lake*, and heighten them with *white*.

*Radishes.*

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*Radishes.* Do them over with *white*, shaded with *lake* and sweetened (as it were behind) with *purple*, and sometimes with green from the top downwards.

Lay the green leaves at the top with *verdigrease* mixt with *sap-green*, shaded with *sap-green*, and heightened with *masticote*.

*Strawberries.* Lay them over with a white ground, and draw that over with vermilion, and lake very thin; shade it with fine *lake*, and heighten with *masticote* mixt with *minium*; and then with white, only speck them with *lake*, by one side of which put a smaller speck of *white*.

*Turnips.* Lay them over with *white*, shaded with *foot*; the leaves as the radish leaves.

*Wallnuts with their green on.* Do with *verdigrease* mixt with *sap-green*; shade with *sap-green* and a little *white*.

*Wallnuts without their green.* Do over with *brown oker*, shadow with *foot*.

FRUITFULNESS is represented by a lady sitting on a bed, and two little infants hanging about her neck.

F. T. F. signifies *Flaminio Torre fecit*, the mark of a painter and engraver.

F. V. F.     ? signifies *Francis Vannes fecit*. *Francis Villam. F. S* mena also us'd the same mark.

ISAAC FULLER was an *English* history painter of good note. He had a great genius for drawing and designing history. Many perfections in his works may be seen by his resurrection at *All-Souls* college chapel at *Oxford*, to which that at *Magdalen* college (though performed by the same hand) cannot in the least compare. There is also at *Wadham* college in the same university a history piece of his in colours admirably well performed. He may be reckoned amongst the foremost in account of *English* painters; he studied many years in *France* under *Perrier*, and understood the anatomical part of painting, perhaps equal to *Michael Angelo*, following it so close that he was very apt to make the musculling too strong and prominent. Amongst his works there are several fine pieces in many great taverns in *London*, which are not esteemed the worst of his performances. He died in *London* about ~~fifty~~ <sup>fifty-six</sup> years ago.

The manner of building FURNACES for making GLASS.

*Agricola* mentions three sorts of *Furnaces* for making glass; the first he calls *fornax calcaria* or *calcar*, which is that where the frit is made.

This furnace is made in the fashion of an oven, about ten foot high and seven broad; this furnace has two vaults, the one A, as in the plate figure 1. is that wherein the fire is made, having a hole on the top, through which the flame passes into the upper vault markt B, where it is reverberated from the roof upon



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upon the ingredients that make the frit, which are laid on the area or floor of this oven or vault, in which they are kept continually stirred about by the workman till they are vitrified and fully prepar'd. There ought to be a very large mouth to this vault, that the frit may be easily stirr'd about by the workman; whereas there should be but a small mouth to the under vault, as serving only to put in the wood for maintaining a continual fire, and taking out the ashes.

In *Agricola's* time, they made use only of coals in glass-houses; but the moderns have found that wood is much better, because being thoroughly dried, it does not smoke like coals, which always makes the glass dull and obscure.

The lumps which lie by the furnace mark'd C are the *frit*, which they break when they are too big, to make them fit to go into pots for the great furnace, there to be purified, and rendered fit to be employ'd as occasion shall require.

The second furnace, or rather oven, which *Agricola* speaks of, is the working furnace, that where the workmen work; but the description he gives of it is not in the best form, for he makes all these ovens round, whereas tho' they are to be round within, they should be oval without.

And besides he gives two mouths in form of chimneys, into which a servitor throws coals day and night, which is not now in use, since there is only dry wood in use, and then the iron grates which he speaks of for the mouth and ash-hole are of no use among us.

The diameter of this oven ought to be always proportional to the height, the oven being divided into three parts, each of which three parts is vaulted.

That below mark'd A is that where the stoker flings in the wood to keep a continual fire, and without smoke; and this lower oven is call'd the crown, and the mouth the *bocca*; but it has in it neither grates nor ash-hole, the wood being cast in on the coals, always taking care to take some of them out, when they are too many, with a large iron hollow shovel.

This oven made like a crown, to which *Agricola* allows but one hole in the middle of its height, about one foot diameter, has notwithstanding several holes all round it, for the vent of the flame, which ascends into the second oven thro' the middle, where the pots fill'd with the ingredients for making the glass are plac'd at E, upon which that flame perpetually reverberates. See plate 1.

The second part of this oven mark'd B, the vault of which is round, serves the workmen.

*Agricola* allots to each of these ovens eight arches; nevertheless we seldom, if ever, make more than six. Between each  
arch

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arch there is an opening or hole, made in the fashion of a window archwise, mark'd C, call'd the great work hole, through which the pots which contain the metal, are put in and taken out.

These large holes are stopp'd each with a cover, made of the same lute and brick that the oven is, to preserve the workmen's eyes from the too vehement heat, and likewise to keep that the stronger in the oven.

In the middle of every one of these covers, there is a hole something more than a palm wide, which is call'd the little working hole, through which the workmen take with their hollow irons the coloured or finer metals out of the pots, with which they make bottles, drinking glasses, or what sort of vessels they please.

It also serves for scalding their vessels, when they have occasion, and which rest upon hooks, made on purpose on the sides of those holes, which the workmen call the little working holes.

The place where they put the pots in the oven, is call'd the floor or ground ; there are always two to each working hole in the little glass-houses; the distinction between which and the great ones will be made anon.

The one, which is the lesser, is full of fine metal, fit to work ; and the other, which is the greater, is fill'd with metal that is to be purified or made fine. When the little pot is empty, it is immediately fill'd again with melted matter with an iron ladle, from the greater pots, when it has been refin'd ; and when the great pot is empty, it is fill'd again with new matter to be melted and refined, which is done alternately, that the workmen may not stand still.

The upper vault of this furnace mark'd D, which is above that where the metal is melted, and the workmen work, serves to set the vessels new made upon, there to cool by degrees, that place having only a moderate heat ; otherwise, if the vessels were too soon expos'd to the cold air, they would break.

This upper vault may also be divided into two, the one half of it being sufficient for cooling the vessels, and the other may be made a *Balneum Mariæ* of divers degrees of heat, sand furnaces, or of ashes for purifications, digestions, distillations, and other uses, and may serve for the preparations of the ingredients, where-with the tinctures are made for glass and crystal, which you will find treated of under their proper articles.

The third *Furnace* of which *Agricola* makes mention, he makes of a square form, and which, he says, is for making green glass ; this is now no more in use, since they are all round on the inside.

## F U L

The ovens of the great glass-houses are round within and oval without, like those of the little glass-houses, already treated of; but there is this difference, that any ingenious workman can build those of little glass-houses; but there is in *France* only one race of masons, who have the secret of building the great ones. The difficulty consists in this, that they must have three degrees more of heat than the little glass-houses, and one inch difference in the arch and body of the oven is enough to spoil the whole process.

These ovens are built like those before-mentioned, except as to the proportions which augment the heat three degrees beyond the others; they have six arches, two of which serve to heat the matter before you put in the pots, and another to heat the pots before they are set into the oven, when there is occasion to change them.

In this oven each working hole has but one pot in it, and in the further end of the oven on the other side of the workmen, there is a great pot wherein the matter or ingredients is prepar'd, out of which it is taken with an iron ladle of ten or twelve foot long, to fill their pots, who work at the rates the pots are emptied; after that the great pot is fill'd again with other matter, to be refin'd and prepar'd as before.

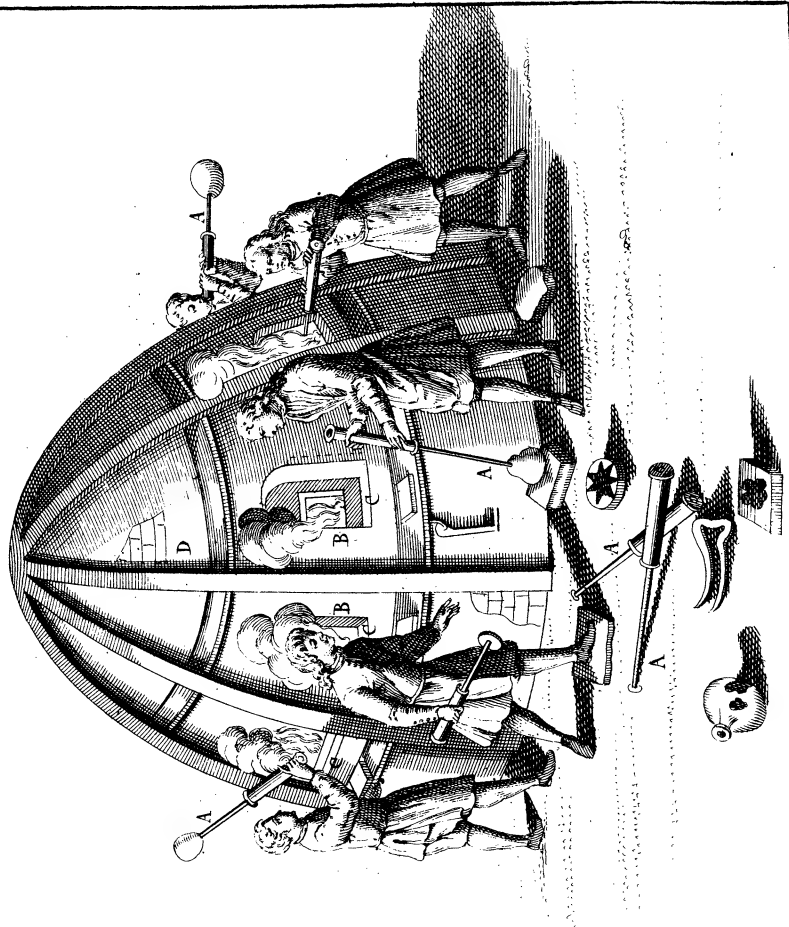
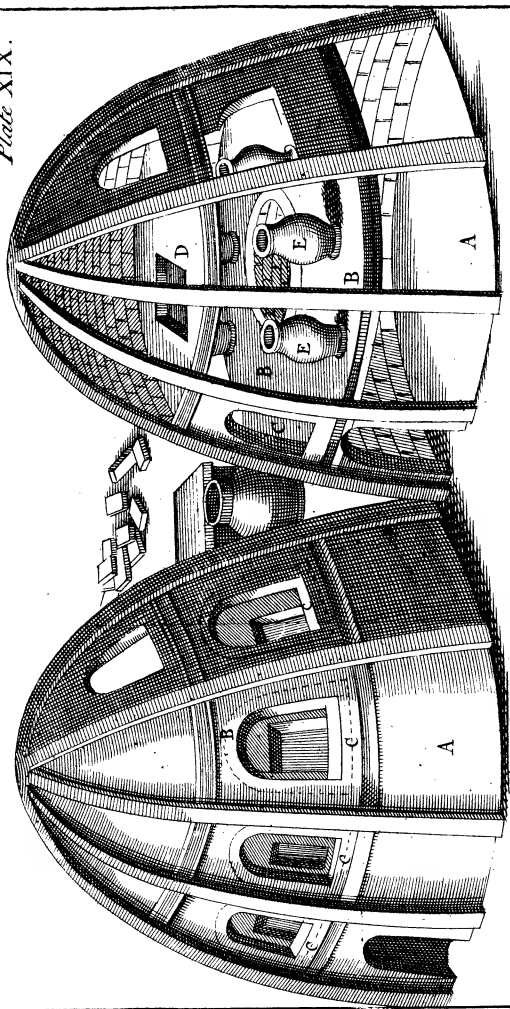
The materials which serve for the building these furnaces are bricks for the outward parts, and a sort of fuller's earth for the inward parts, which is gotten in *France* from *Beliere* near *Forges*, and which is the only earth in all *France*, which has the property of not melting in this excessive heat; and it is of this same earth also that the pots are made, which will hold the metal for a long time.

The worst and roughest work in this art is the changing the pots, when they are worn out or crackt; for that the cover of the great hole of the oven or working hole must be taken off, and the faulty pot so taken out, and a new one put in its place through the flames, and that very speedily; the one is done with only hands, and the other is perform'd with iron hooks and forks.

But before they set about this rough work, those who do it clothe themselves in a sort of skins in the shape of a pantaloon, which they make as wet as possible, and which covers them all over except the eyes; and for them they make use of glass to see to guide themselves.

And indeed without such a sort of clothing it would be almost impossible to manage this change of the pots, by reason of the long time that it would otherwise take up, and which would be yet more incommoded by the vast and intense heat proceeding from the great mouth of the furnace.

FULLING





## F U L

**FULLING** is the art or act of cleansing, beating and pressing cloths, stuffs, stockings, to render them stronger, closer and firmer, call'd also milling.

The *Fulling of cloths* and other stuffs is perform'd by a water mill, thence call'd a *fulling* or *scouring mill*.

These mills differ not much from corn-mills, except in what relates to the millstones and hopper; and there are some which serve indifferently for either use, cloths being full'd and corn ground by the motion of the same wheel.

And in some places and particularly in *France*, the *fullers* are call'd *millers*, as milling stuffs and grinding corn both at the same time.

The principal parts of the *fulling mill* are the *wheel*, with its trundle, which gives a motion to the *tree* or spindle, whose teeth communicate it to the *pestles* or stampers, which are hereby rais'd up and let fall alternately, according as its teeth catch on or quit a kind of latch in the middle of each pestle.

The pestles and troughs are made of wood, each trough having at least two and sometimes three pestles, as the owner shall think fit, or according to the force of the stream of water.

In these troughs are put the cloths, stuffs, &c. that are to be *fulled*; then the current of water being let fall on the wheel, the pestles are successively rais'd and let fall upon the cloth, &c. in the troughs, and by their weight and velocity, stamp and press the stuffs very strongly, which by this means become thickened.

In *Fulling* they sometimes make use of urine, sometimes of fullers earth, and sometimes soap.

These stuffs are prepar'd to receive the first impressions of the pestle by laying them in water and urine; then in fullers earth and water; and lastly in soap dissolv'd in hot water.

Soap alone would do very well, but that it is expensive, tho' fullers earth in the way of the *English* dressing is scarce inferior to it; but then it must be well clear'd of all stones and grittinesses, which are apt to make holes in the stuff.

As to urine, that is accounted prejudicial, not so much upon account of its smell, but its sharpness and saltness, which is apt to render the stuffs dry and harsh.

The true method of *Fulling* with *soap* is delivered by *Monf. Colinet* in an authentick memoir on that subject, supported by experiments made by order of the *Marquis de Louvois*, then superintendent of the arts and manufactories of *France*. The substance of which is as follows.

A colour'd cloth of about forty-five ells is to be laid in the usual manner in the trough of a fulling mill, without first soaking it in water, as is the common practice in many places.

## F U S

Fifteen pounds of soap will be required to full this trough of cloth, one half of which is to be melted in two pails of river or spring water made as hot as the hand can well bear it.

This solution is to be pour'd by little and little upon the cloth, in proportion as 'tis laid in the trough; and thus full'd for full two hours and more; after which it is to be taken out and stretcht.

Which being done, the cloth is to be immediately put again into the same trough without any new soap, and then full'd for two hours more; then it is to be taken out, and wrung well to express or squeeze out all the grease or filth.

After the second *Fulling* the remainder of the soap is melted as the former, and cast at four different times on the cloth, always remembring to take out the cloth to stretch it every two hours, and to get out the plaits and wrinkles it has acquired in the trough.

When it is perceived to be sufficiently full'd, and brought to that quality and thickness it should be, it is scoured out for good in hot water, keeping it in the trough till quite clean.

As to white cloths, because they full more easily, and in less time than colour'd ones, a third part of soap will serve.

FULLING of stockings, caps, &c. should be perform'd something differently, *viz.* either with the feet or the hands with a kind of rack or wooden machine, either armed with teeth of the same matter, or else horses or bullocks teeth.

The ingredients us'd in *Fulling*; these are urine, green soap, white soap, and *Fullers* earth; but the urine is look'd upon as prejudicial.

Wove stockings should be full'd with soap only; but knit stockings may have fullers earth used with the soap.

FURY is represented in painting by a man shewing madness in his looks, his eyes tied with a fillet, in a posture as if he had a mind to throw a bundle of arms bound up; in a short habit. The fillet denotes the understanding lost, when madness has dominion; for madness is the blindness of the mind. The arms signify that *Fury* is ever armed for revenge; the short garment shews that he respects neither decency nor good manners.

FUSTICK } is a yellow wood us'd in dying. The colour it  
FUSTOCK } yields is a fine golden yellow; but there ought to be some other ingredients mixt with it to make it lasting.

The tree that produces it grows in all the *Antilles* islands, but particularly in *Tabago*, where it grows to a very great height.

It is us'd by dyers, chiefly in dying blacks; but some say it should not be us'd at all.

There is also another kind of *Fustick* or *fustel* growing in *Italy*, *Provence*, &c. us'd in dying a coffee-colour.

G. A.



## G.

**G.** A. stands for the heirs of *John Agucchia*.

**GALATEA**, a sea goddess, is describ'd as drawn in a chariot of a strange form, by two huge dolphins, guided by two silver reins, held in the hands of old *Tritons* daughters; over her head a canopy of purple silk and silver, with her hair hanging carelessly on her shoulders.

She is also describ'd as a most beautiful young virgin, her hair dishevell'd and hanging carelessly about her shoulders, like silver threads; and at each ear a fair pearl, with a double string of them (sometimes) about her neck and left arm; a mantle of pure, thin, and fine white, waving as it were by the gentle breathing of the air, viewing in her hand a sponge made of sea froth.

**GANGES.** This *Indian* river is represented in painting in the shape of a rude, barbarous savage, with bended brows of a fierce and cruel countenance, crowned with a palm, having as other rivers, his pitcher, and by his side a rhinoceros.

*The plan of a GARDEN in perspective.*

What has been already observ'd is confirm'd by this plan, for drawing lines from all the divisions on the base-line to the point of sight, the diagonal will give the depth of the whole plan, and the diminution of all the little squares.

Lastly, setting off the alleys, figures, &c. from the correspondent quantities in the geometrical plan, the whole parterre will be found in perspective, as is shewn in the figure.

Let the plan given you to diminish and put in perspective be of what sort soever, the readiest way will still be to draw a square about it, and divide that into several lesser squares.

For putting the grand square with all the lesser ones in perspective by the ordinary rules, you have nothing else to do but to take care that every thing take up the same number of little squares in the diminish'd plan, as in the geometrical one, and the figure of the one will be found in the other. See the plate.

**GARMENTS.** In drawing garments, be sure to draw the out-lines very true, because the whole grace of a picture consists most in the outmost draught, more than in the curious work within.

And to perform this exactly, the garments must be drawn so as to suit the body, and to bend and yield with it, and not strait and stiff where that bends.

## G A R

And to fit the garments rightly to the body, it must be well observ'd which side of the body bends in or out, that the garment may answer to the body upon the least turning any way.

And that the garment may turn with it, you must observe where the body would come, if it were naked, and there draw the garments in the right place, making them bend according to the joints and limbs of the body, and sometimes those plainly do appear through the garments, especially where the garments are driven by the wind, or by any other cause, lie close to the body, or loose from it.

Indeed where the body or any part of it sticks out more than the other, it should be shewn in a plain and visible manner, through the *Garments*.

Begin at the upper part of the *Garment*, and so draw down that part of the *Garment* (on both sides) that lies close to the body, before you draw the loose parts that fly off from the body; for if you draw the loose parts first before you have finished those parts that lie close to the limbs and parts of the body, you will be soon out, and apt to place the body awry and crooked; therefore many masters draw the naked body first, and the *Garments* afterwards, by which means they can better see to place the garments rightly, so as to hang even upon the body. By these means you may be sure to place the body strait, by drawing those parts of the garments first that lie nearest upon the body or limbs.

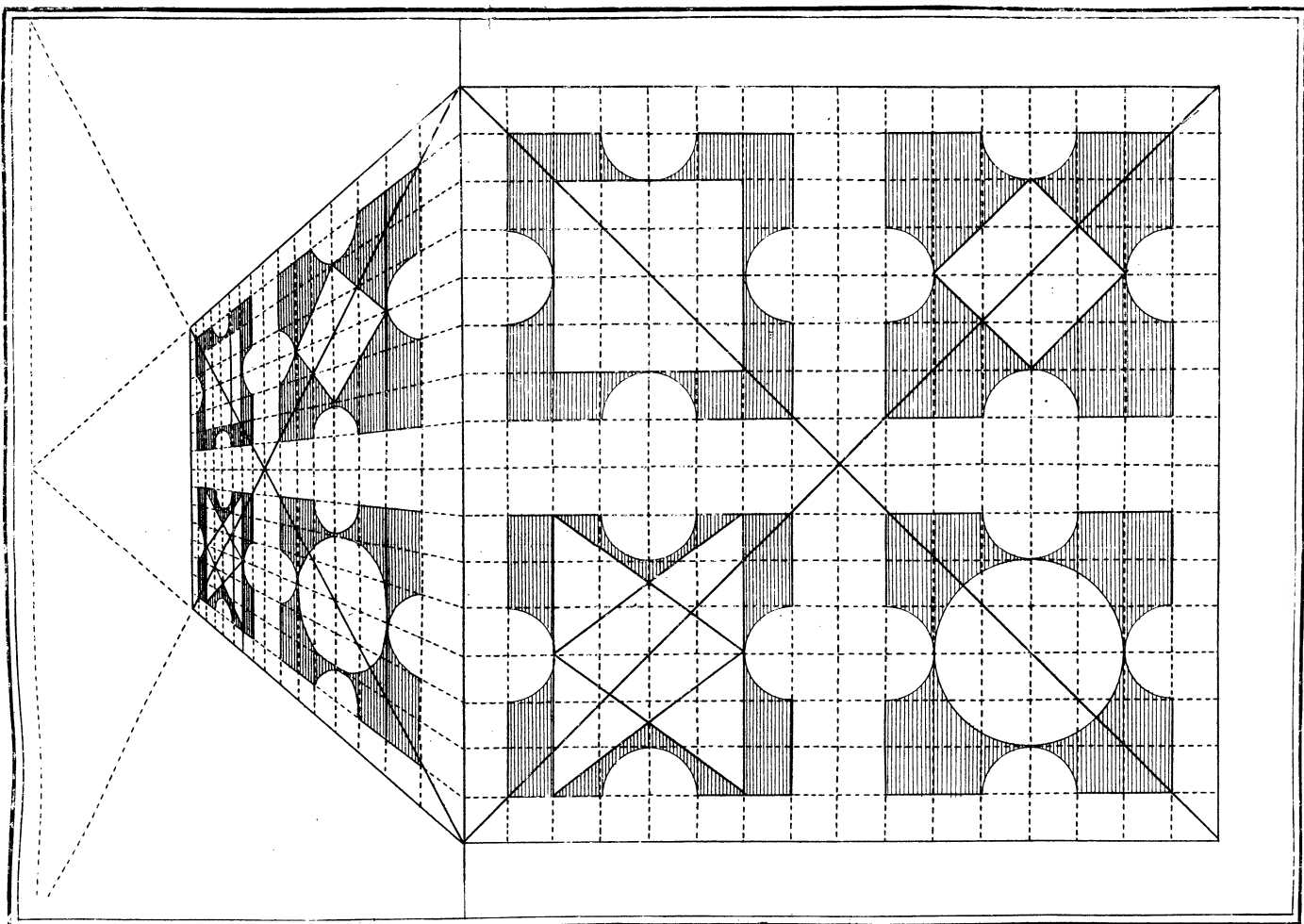
You must draw the greatest folds first, and so strike the greater folds into the less; and be sure not to let one fold cross another.

Break also some of the great folds into the less, and the closer the garment fits the narrower the folds must fit.

And you must observe to order the garments so, that the folds may fall all one way, especially in a standing figure; tho' sometimes it will be otherwise, as when a figure is drawn sitting. But the *Garments* of a standing figure are subject to be driven by the air, and therefore must be placed one way. But you must also take care not to fold the *Garments* in any place, where they should fit strait, as the breasts, knees, and thighs which bear them out; which must be surpriz'd by the appearance of them thro', and therefore the *Garments* must fit plain. See DRAPERY.

*Of shadowing GARMENTS, and placing the lights.*

Let all lights be plac'd one way in the whole piece, whether in figure, faces or garments. If the light fall sideways on the picture, you must make the other side (which is furthest from the light) darkest. And let the light be plac'd all together on the one side, and not confusedly on both sides alike, as if it stood in the midst of many lights; for the body cannot otherwise be lightened equal in all places. Never-





Nevertheless you may observe, that in expressing a dungeon or a prison, wherein a torch or candle is lighted, you must observe that every thing in it, as well as the garments, must receive their light from it, and therefore must be shadowed all on the contrary side, that is on that side farthest from it. See the articles LIGHT and shadow.

noe8

NOEL GARNIER, engraver of grotesques, ornaments and figures, particularly of arts, in forty-eight pieces. He used this mark.

MARK GARRARD, Son of *Mark Garrard*, and born at *Bruges* in *Flanders*. He was sometime principal painter to *Queen Elizabeth*, afterwards to *Queen Anne*, royal consort to *King James I.* He was both a good history and face painter; he died in *London* in the year 1635, in the seventy-fourth year of his age. There are several of his prints extant among us.

HENRY GASCAR, a *French* face-painter, encouraged here by the *Duchess of Portsmouth*, whose picture he came over to draw. Many following her example, employed him also, so that he got a great deal of money in *England* in a short time, nor could our wise nation see the difference between him and his cotemporary *Sir Peter Lely*. What the former wanted in the graceful part, in draught and a good choice of nature, the talent of but very few, he usually made up with embroidery, fine cloaths, laced drapery, and a great variety of trumpery ornaments, which took for a while, till at length *Monsieur* found that his gay cap and feather would no longer succeed here, which made him leave *England* about fifty-one years ago, and by a prevailing assurance customary with his nation, he has since imposed as much on the *Italian* noblesse, as he did on those of *England*; and was lately living in *Rome*, though we hear he is now dead. He is reported to have carried above ten thousand pounds out of *England*.

GEMS. The design of this work is to make art imitate nature, which may in this be done to such a degree, as that the artificial gems may seem to surpass the natural oriental ones in beauty and colour, and want nothing of their perfection but the quality of hardness.

The basis of artificial gems is natural or rock-crystal, which is a substratum made only of a congealed water, and a pure subtile earth, as other precious stones are.

But precious stones differ from crystal in this, that they are tinged with a proper sulphur or unctuous substance, which has insinuated it self into the pores of their composition, which not only tinges them, but also fixes them, and gives them that admirable beauty, and hardness which they possess.

## G E M

This sulphur is suppos'd to be an exhalation of metalline and mineral spirits, ascending up by the force of a terrene central fire, containing a vast number and variety of colours, undetermined, till brought into act, and fix'd in their proper subjects.

Now the art of making these counterfeit *Gems* is the imitation of nature, by giving to a proper matter or body, such as is that of rock-crystal, such metalline and mineral tinctures, as shall be extracted from metals or minerals, perfectly fine and subtile in themselves, and able to resist the fire; and these tinctures, tho' volatile, are fix'd in crystal without altering their colour.

As for instance, *verdegrease*, when put on the fire, though it changes its colour, yet being mixt with crystal in fusion, it becomes fixt and unchangeable in its tincture; for metalline and mineral colours always return to their principle, and tho' they be volatile, yet they are retain'd by the great quantity of the fixed, which chains or over-powers them.

Therefore, for this purpose, those unalterable colours are to be chosen, which have a fixity in the midst of fire, being mixt one with another, as for instance, *blue* and *yellow* make a *green*; therefore you must take such a blue as cannot be altered by fire, nor be totally overcome by the *yellow*, that you mix with it; as also a *yellow*, that the fire cannot change, nor yet be totally overcome by the *blue*.

*Isaac Hollandus* is said to be the first that wrote on this subject, and first discovered this admirable art of making artificial *Gems*, and who perform'd many other things almost incredible.

And you will find dispers'd in this work, under their proper articles, his preparations for this purpose, as to pastes, tinctures and methods of working them, in making artificial *agates*, *berils*, *diamonds*, *emeralds*, *granates*, *rubies*, *sapphires*, *topazes*, &c.

### *To prepare the salts for counterfeit GEMS.*

The salts us'd in making counterfeit *Gems* are chiefly two, the first is made of the herb *kali*, the second of *tartar*; their preparations are according to the usual way (but in glass vessels.)

### *To prepare the matter of which GEMS are made.*

The matter is either *crystal* or *flint* that is clear and white; put them into a crucible in a reverberatory fire (the crucible being covered) then take them out and cast them into cold water, so will they crack and be easily reduced to powder; to which powder take an equal quantity of salt of *tartar* (or *sal alkali*) to which mixture add what colour you please, which must be either metalline or mineral; put them into a very strong crucible (filling it about half full) cover it close and melt it all in a strong fire, till it becomes like glass.

*Take*

## G E N

*Take notice, that in melting you must put an iron rod into it, and take up some of it; and if it is free from bubbles, grains or specks, it is fus'd enough; if not, you must fuse it till it is free.*

GENEROSITY is represented in painting by a virgin so amiable that she attracts all eyes, cloth'd in a mantle of gold gauze, leaning her left hand upon a lion's head, holding in her right (lifted up) chains of pearl and precious stones, as if she meant to make a present of them.

Her youth denotes her extraordinary courage and generosity, which never degenerates; the naked arm, the property of this virtue to divest itself of all interests, and to be kind without hope of receiving any thing in exchange. The lion declares grandeur and courage.

GENIUS is represented in painting by a naked child of a smiling countenance, with a garland of poppy on his head, ears of corn in one hand, and a bunch of grapes in the other.

It is taken to be the inclination to something, for the pleasure it affords, to some in learning, to some in musick, and to some in war.

The *Antients* took it for the common preservation of worldly things, and amongst them not only human beings had their genius, but even insensible things also.

HORATIO GENTILESCHI was an eminent *Italian* history painter, born at *Pisa* a city in the Dukedom of *Tuscany* in the year 1578, after having made himself famous at *Florence*, *Rome*, *Genoa*, and in most parts of *Italy*, *Savoy*, and *France*, at last, he upon the invitation of King *Charles I.* came over to *England*, and was well received by him, who appointed him lodgings in his court, gave him a considerable salary, and employed him in his palace at *Greenwich* and other places; his most remarkable performances in *England* were the cieling at *Greenwich* and *York-House*, the latter of which are now in the collection of the present Duke of *Buckingham*. He did also a *Madonna*, a *Magdalen*, and *Lot* and his two daughters for King *Charles*; all which he performed admirably well. The piece of his which was most esteemed abroad, was the portico of Cardinal *Bentivoglio's* palace at *Rome*; he made several attempts of face-painting while in *England* with little success, his talent lying wholly towards history, with figures as large as the life, in which he excell'd. He was much in favour with the Duke of *Buckingham*, and many of the nobility of that time; but after twelve years continuance in *England*, he died here in the year 1662, aged eighty-four, and lies buried in the Queen-Dowager's chapel at *Somerset-House*. His print is among the heads of *Van Dyck*, he having been drawn by that great master.



ARTEMISIA GENTILESCHI was but little inferior to her father in histories, and even excell'd him in portraits, a manner of painting which most are inclined to attempt who come to *England*, where it is chiefly in vogue. She lived the greatest part of her time at *Naples* in much splendor, and was as famous all over *Europe* for her amours as for her painting. She recommended herself to the esteem of the skilful by many history pieces as big as the life, amongst which, the most celebrated was that of *David*, with the head of *Goliath* in his hand. She drew also the portraits of some of the Royal Family, and many of the nobility of *England*.

GEOGRAPHY is represented in painting, &c. by an old dame in an earth-coloured garment, a terrestrial globe at her foot, the compasses in her right-hand, wherewith she measures the said globe, and a geometrical square in her left.

Her old age denotes the antiquity of this art; the compasses the measuring and describing the earth, which is truly *Geography*; the square, the taking several proportions, length, breadth, &c.

G. F. signifies *Giorgio of Mantua fecit*. In a piece of *Primaticcio's*, representing *Vulcan's* forge.

**GMF or MT**

These two marks were used by *Giorgio Ghisi* of *Mantua*, he sometimes put *Ghisi Mantouan fecit*.

RICHARD GIBSON, commonly call'd the *Dwarf*, was a disciple of *Francis de Cleyn*, and an eminent master in the time of *Sir Peter Lely*, to whose manner he devoted himself, and whose pictures he copied to admiration. Being page to a lady at *Mortlack*, she put him to *de Cleyn* to learn to draw; which she observ'd he had a particular genius to. He had the honour to instruct in drawing the late *Queen Mary*, when Princess of *Orange*, and *Queen Ann* when Princess; he went over to *Holland* to wait on the princess *Mary* for that purpose; he painted both in oil and water colours, but chiefly in the latter; he was greatly in favour with *King Charles I.* (to whom he was page of the back-stairs) insomuch that the King gave his wife in marriage, who was likewise a dwarf, and was not long since living though of a great age.

He received considerable favours from *Philip Earl of Pembroke*, who was his patron; he drew *Oliver Cromwell* several times, and died in *Covent-Garden* soon after the revolution, at seventy five years of age; he lies buried in that church.

WILLIAM GIBSON was nephew to the foregoing, and instructed both by him and *Sir Peter Lely*, his greatest excellencies lay in his copies, after the last of those two masters, whose manner he made it his chief endeavour to imitate, and herein he was

not altogether unsuccessful; he became an eminent limner, and drew a great many portraits for many of the best rank. His great industry was much to be commended for purchasing not only the greatest part of Sir *Peter's* collection after his death, but likewise for procuring beyond sea, a great many valuable things in their kind, that he may well be said to have had the best collection of drawings and prints, after the greatest *Italians* and other masters, of any person of his time; he was a great encourager of the art he profess'd; he died lethargick in *London*, and was buried at *Richmond* in *Surrey* in the year 1702, at fifty eight years of age. His kinsman Mr. *Edward Gibson* was instructed by him, and first painted portraits in oil, but afterwards finding more encouragement in crayons, his genius lying that way, he made a considerable progress therein, till death intervening put a stop to all his endeavours. He died young at thirty three years of age, and lies likewise buried at *Richmond*.

GILDING is the art of spreading or covering a thing over with gold, either in leaf or liquid.

The art of *Gilding* was not unknown to the ancients; though it never arriv'd among them to the perfection to which the moderns have brought it.

*Pliny* relates, that the first *Gilding* that was seen at *Rome* was not till after the destruction of the city, in the time of the consulship of *Lucius Mummius*; at which time they began to *gild* the ceilings of their temples and palaces; the capitol being the first structure adorn'd with this inrichment.

He also adds, that luxury grew so hastily upon them, that in a little time you might see all even private and poor persons *gild* the very walls, vaults, &c. of their houses.

But we have this advantage of the ancients in the manner of using and applying the gold, the secret of painting in oil, lately discovered furnishes us with means of *Gilding* works, that will endure all the violences of time and weather; which was impracticable to the ancients.

They knew no way of laying the gold on bodies, that would not endure the fire; but with whites of eggs or size, neither of which will endure the water; so that they could only *gild* those things, which stood in such places as were sheltered from wet, and the humidity and moisture of the air.

The *Greeks* us'd a sort of composition for *Gilding* on wood, which they call'd *leucopheum* or *leucophorum*; which is describ'd as a sort of glutinous compound earth, which in all probability serv'd to make the gold stick and bear polishing.

But as to the particulars of this earth, its colour, ingredients, &c. naturalists and antiquaries are not agreed.

## G I L

There are several methods of *Gilding* in use among us, as *Gilding in water*, *Gilding in oil*, *Gilding by fire*, &c.

### *The method of* WATER GILDING.

*Water Gilding* requires more preparation than *oil Gilding*, and is chiefly on wooden works, and those made of *stuc*, and these too must be sheltered from the weather.

A *size* is us'd for this way of *Gilding* made of threads, &c. of parchment, or gloves boil'd in water to the consistence of a gelly.

If the thing to be *gilt* be of *wood*, it is first wash'd with this *size*, boiling hot; and then set to dry, and afterwards with white *paint*, mix up with the same *size*.

Some use *Spanish white* for this purpose, and others *plaster of Paris*, well beaten and sifted.

This *siz'd paint* must be laid on with a stiff-brush; which is to be repeated seldomer or oftener, according to the nature of the work, as ten or twelve times in flat or smooth works; but seven or eight will be sufficient in pieces of sculpture.

In the former case they are apply'd by drawing the brush over the Work, in the latter by dabbing it.

When the whole is dry, they moisten it with fair water, and rub it over with several pieces of coarse linen, if it be on the flat; if not, they beat or switch it with several slips of the same linen tied to a little stick, to make it follow and enter all the cavities and depressures thereof.

Having thus finish'd the *white*, the next thing to be done is to colour it with yellow *oker*; but if it be a piece of sculpture in *relievo*, they first touch it up, and prepare the several parts which may have happened to have been disfigured by the small iron instruments, as gouges, chissels, &c.

The *oker* us'd for this purpose, must be well ground and sifted, and mix'd up with the *size* beforementioned.

This colour is to be laid on hot; and in works of sculpture supplies the place of gold, which sometimes cannot be carried into all the depressures and cavities of the foliages and other ornaments.

A *lay* is also apply'd over this yellow; which serves for the ground on which the gold is to be laid; this *lay* is usually compos'd of *Armenian bole*, *blood-stone*, *black-lead*, and a little *fat*; to which some add *soap* and *oil of olives*; others *burnt-bread*, *bistre*, *antimony*, *glass of tin*, *butter* and *sugar-candy*.

These ingredients being all ground together with hot *size*, three *lays* of this composition is apply'd upon the yellow, the one after the other has been dry'd; being cautious not to put any into the cavity of the work to hide the yellow.

The brush us'd for this purpose must be a soft one, and when  
the

## G I L

the matter is become very dry, they go over it again with a stronger brush to rub it down, and take off the small grains that stick out; in order to facilitate the burnishing of the gold.

To be prepared for *Gilding*, you must have three sorts of pencils; one to wet, another to touch up and amend, and a third to flatten; also a *Gilding* cushion for spreading the leaves of gold on when taken out of the book. See CUSHION, a knife to cut them and a squirrel's tail fitted with a handle; or else a piece of fine soft stuff on a stick, to take them up directly and apply them.

You are first to begin with wetting your pencils; by which the last *lay* laid on with water is moistened, that it may the better receive and retain the gold. Then you are to lay the leaves of gold on the cushion, and if whole, you must take up with the squirrel's tail; but if in pieces, with the other instrument, or the knife wherewith they are cut, and lay and spread them gently on the parts of the work you had moistened before.

If the leaves (as they frequently do) happen to crack or break in laying on, these breaches must be made up with small bits of leaf taken up upon the repairing pencil, and the whole work is to be smooth'd either with the same pencil or another something larger; the gold being pressed into the dents, into which it could not be so easily carried by the squirrel's tail.

The work having been thus far gilded, must be set by to dry in order to be either burnished or flatted.

Burnishing is smoothing and polishing it with a burnishing tool, which is usually a dog's or wolf's tooth or a blood-stone fitted into a handle for that purpose. See BURNISHING.

Flatting it is giving it a light lick, in the places not burnish'd, with a pencil dipt in *size*, in which a little *vermilion* sometimes has been mixt. This serves to preserve and prevent its flawing when handled.

The last operation is the applying the *vermeil* in all the little lines and cavities; and to stop and amend any little faults with shell gold.

The composition call'd *vermeil* is made of *gum guttæ*, *vermilion*, and a little of some ruddy brown colour ground together, with *Venetian varnish* and oil of *turpentine*. Some gilders instead of this, make shift with fine *lucca* or *dragon's blood* with *gum water*.

Sometimes instead of burnishing the gold, they burnish the ground or composition laid on the last before it, and only afterwards wash the part over with the *size*.

This method is chiefly practis'd for the hands, face, and other nudities in *relievo*; which by this means, don't appear so very brilliant as the parts burnished; though much more so than the parts perfectly flat.

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To gild a piece of work, and yet preserve white grounds, they apply a lay of *Spanish white*, mix'd with a weak fish glue on all the parts of the ground, whereon the yellow or the last lay might run.

### *The method of GILDING in oil.*

This operation requires much less *apparatus* than that before-mentioned.

The basis or matter whereon the gold is laid, in this method is the remains of colours found settled to the bottom of the pots in which painters wash their pencils.

This matter which is very viscid or sticky, is first ground, and then pass'd through a linen cloth; and thus lay'd with a pencil on the matter to be gilt, after it has been wash'd once or twice over with *size*; and if it be wood with some white *paint*.

When this is almost dry, but yet is still unctuous enough to catch and retain the gold, the leaf gold is laid on; either whole, if the work be large, or cut to pieces if smaller; the leaves of gold are taken up and laid on with a piece of fine, soft, well carded cotton; or sometimes by a palat for the purpose, or sometimes with the knife with which the leaves were cut, according to the parts of the work that are to be gilded, or the breadth of the gold that is to be laid on.

As the gold is laid on, they pass over it a coarse stiff pencil or brush to make it stick, and as it were incorporate with the ground; and after this they mend any cracks that may have happened in it, either with the same pencil or one that is smaller; as has been shewn before in *water Gilding*.

This kind of *Gilding* is chiefly us'd for domes and roofs of churches, courts, banquetting-houses, &c. and for figures of *plaster of Paris*, *lead*, &c.

### *The method of GILDING with liquid gold.*

This is perform'd by *gold* reduc'd to a calx and amalgamated with *Mercury*, in the proportion of about an ounce of *Mercury* to a dram of *gold*.

To perform this, they heat a crucible red hot, and then put the *gold* and *Mercury* into it, stirring them gently about till the *gold* be found melted, and incorporated into a mass with the *Mercury*.

When this is done, they cast them into water to wash and purify them; and out of that into other waters, where the *amalgama* which is almost as liquid, as if there were nothing but quicksilver in it, may be preserv'd a long time for use.

Before they proceed to lay this amalgamated *gold* on the metal, they first render the metal rough, by washing it over with *aqua fortis* or *aqua secunda*; and afterwards rinse the metal in fair water, and scour it a little with fine *sand*, and then it is ready for the *gold*. Then

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Then they cover over the metal with the mixture of *gold* and *Mercury*, taking it up with a slip of copper or a brush made of brass wire, spreading it as even as possible, to do which they wet the brush from time to time in fair water.

Then they set the metal to the fire upon a grate or in a sort of cage, under which stands a pan of coals; and in proportion as the *Mercury* evaporating and flying off discovers the places where *gold* is wanting, they take care to supply them by adding new parcels of *amalgama*.

Then the work is rubb'd over with the wire-brush dipt in beer or vinegar, which leaves it in a condition to be brought to a colour, which is the last part of the process; and which the gilders keep to themselves as a mighty secret; though it is certain, it cannot differ much from the manner of giving *gold* species their colour in coining.

*The method of GILDING by fire on metal.*

There are two ways of performing this. The one with leaf *gold* and the other with liquid *gold*.

To prepare the metal for the first, they scratch it well or rake it; then polish it with a polisher; and afterwards set it to the fire to blue, *i. e.* to heat, till it appear of a blue colour.

When this has been done, they clap on the first lay of leaf *gold*, rubbing it lightly down with a polisher; and expose it thus to a gentle fire.

They usually only give it three such lays or four at the most, each lay consisting of a single leaf for common works; and of two for extraordinary ones, after each lay it is set fresh to the fire, and after the last lay, the *gold* is in condition to be burnish'd.

*The way of GILDING and LACKERING in oil.*

Of mixing and laying on the *gold size*.

1. First prime the piece with the priming. Take the best *gold size*, *fat oil*, of each according to the quantity of your work, grind them well on a stone, and put them into a gally-pot.

2. Pass the piece all over with a clean brush dipt into this *size*, but do not lay it on thick, jobbing and striking the point of the pencil into the hollow places of the carv'd work, so that no part may escape; for if any place be untouch'd with the *gold size*, the *gold* will not stick upon it, and in those places the work will be faulty.

Let it stand by (perhaps twenty four hours or more) so that it may be but just clammy enough to hold the metals, to know if it be in a fit condition; breathe upon it, and if your breath remains upon it like a mist, you may then lay on your leaf *gold*; or if it is so dry, that it does not discolour, nor stick to your finger, but is clammy, and not parting very readily with your finger; it is then in a fit temper.

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3. If you should lay on your metal before the *size* is dry enough, it would as it were drown the leaf *gold*, *silver*, &c. and deprive it of its gloss and lustre; and if it should be let stand till it is too dry, then the gold, &c. would not stick.

*How to lay on leaf gold.*

Cut the leaf *gold* and *silver* on your *Gilding* cushion, with a thin, broad, smooth, sharp edg'd knife.

Then having your *pencil*, *cotton* or *pallat* ready (made of a squirrel's tail) breathe upon the *gold*, and touch and take it up, and lay it upon the place you intend for it, pressing it down close with your *pencil* or *cotton*.

And if any parts have escaped being covered with the *gold*, cut some small pieces and lay them on; proceeding after this manner, till the whole work is gilded or covered with your metal.

After twenty four hours, jobb down and press over the whole work gently with a fine large brush, to make the *gold* stick upon all the uneven and hollow parts of the carving; then with fine soft shammy leather, as it were polish and rub it over smoothly.

This being done, the *gold* will appear of an admirable lustre, and the beauty of it will be so durable, that though it be expos'd to the wind and weather, it will not receive any damage for many years.

**GILDING.** *To lay gold on any thing.*

Take *red lead* ground fine, temper it with *linseed-oil*, write with it, and lay leaf *gold* on it, let it dry and polish it.

*To gild GLASS.*

Take *chalk* and *red lead* of each a like quantity, grind them together and temper with *linseed-oil*; lay it on, and when it is almost dry, lay leaf *gold* on it; let it dry, and then polish it.

*To gild IRON with a water.*

Take *spring water* three pounds, *roch allum* three ounces, *Roman viiriol* and *orpiment* of each one ounce, *verdegrease* twenty four grains, *sal gemma* three ounces; boil these all together, and when it begins to boil, put in *tartar* and *bay-salt*, of each half an ounce; continue the boiling a good while, then take it from the fire, strike the iron over with it, dry it against the fire, and burnish it.

*To GILD IRON or other metals with GOLD.*

Take one pound of liquid *varnish*, *linseed-oil* and *turpentine*, of each one ounce; mix them well together, strike them over any metal, and afterwards lay on leaf *gold* or *silver*, and when it is dry, polish it.



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To GILD *silver, brass or copper* with GOLD WATER.

Take two ounces of *quicksilver*, put it into a crucible, set it on the fire, and when it begins to smoak, put in an angel of fine *gold*; then take it off immediately, for the *gold* will be presently dissolv'd; then, if it be too thin, strain a part of the *quicksilver* from it through a piece of fustian; when you have done this, rub the *gold* and *quicksilver* upon *brass* or *silver*, and it will cleave to it; then put the said *brass* or *silver* upon quick coals, till it begins to smoke, then take it from the fire, and scratch it with a hair brush; this do till all the *Mercury* is rubb'd as clean off as may be, and the *gold* appear of a faint yellow; then heighten the colour with *sal armoniack*, *bole* and *verdegrease* ground together and tempered with water.

Where you must take notice, that before you gild your metal, you must boil it in *tartar* or *beer* and *water*.

Another water for GILDING *iron, steel, knives, swords, &c.*

Take *fire-stone*, reduce it to powder, put it into a strong *red wine vinegar* in a glaz'd pot for twenty four hours, adding more *vinegar* to it as it evaporates or boils away; into this water dip the *iron, steel, &c.* and it will be black; dry it, and then polish it, and you will have a gold colour underneath.

Another way of GILDING IRON.

Take *salt-petre, rock allum* burnt, of each an ounce, *sal armoniack* two ounces, all reduc'd to fine powder; boil them in strong *vinegar* in a copper-vessel, with which wet the *iron, &c.* and then lay on leaf *gold*.

Another way.

Grind *rock allum* with the *urine* of a boy, till it is well dissolv'd, with which anoint the *iron*, heat it red hot in a fire of wood coals, and it will be like *gold*.

Another way.

Put two ounces of *allum*, three ounces of *sal gemmæ, Roman vitriol* and *orpiment*, of each one ounce, of *flos æris* twenty four grains into three pounds of *water*; and boil them all in *tartar* and *water*, as is directed in *Gilding iron with water*.

To make iron of a golden colour.

Take *linseed oil* six ounces, *tartar* four ounces, *aloes* an ounce, *saffron* ten grains, *turmerick* four grains; yolks of eggs boil'd hard and beaten four ounces, boil them all in an earthen vessel, and anoint the *iron* with the oil, and it will look like *gold*. If the *linseed-oil* be not enough, you may put in more.

Another way for iron, glass or bones.

Take a new lay'd egg, make a hole at one end, and take out the *white* and fill up the egg with *quicksilver* two parts, *sal armoniack* reduc'd to a fine powder one part; mix them all together with a wire or little stick, stop the hole with melted wax,

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over which put an half *egg-shell*; digest it in horse dung for a month, and it will be a fine golden coloured liquor.

### To GILD on WOOD or STONE.

Take *bole armoniack* and oil of *ben*, of each a sufficient quantity; beat and grind them together, and smear the wood or stone, and when it is almost dry, lay on leaf *gold*, let it dry, and polish it.

### To gild with leaf gold.

Grind leaves of *gold* in a few drops of honey, and add to it a little *gum water*, and it will be excellent to write or paint with.

### To gild silk and linen.

Lay some parchment *glue* on the silk or linen, gently that it may not sink; then mix and grind *cerufs* and *verdegrease* together, of each a like quantity, mix them with varnish in a glaz'd vessel, let it simmer over a small fire, and keep it for use.

### Another of a pure gold colour.

Take the juice of fresh *saffron*, or *saffron* ground, the best clear *orpiment*, of each a like quantity; grind them with goat's *gall* or *gall* of a pike (which is better) digest twenty eight days in horse-dung, and it is done.

### To gild iron or steel.

Take of *tartar* one ounce, *vermilion* three ounces, *bole armoniack* and *aqua vitæ*, of each two ounces, grind them together with *linseed-oil*, and put to it the quantity of a hazle-nut of *lapis calaminaris*, and in the end grind a few drops of *varnish*; then take it off the stone and strain it through a linen cloth (for it must be as thick as honey) then strike it over iron or steel, let it dry; then lay on your *silver* or *gold* and burnish it.

### To colour tin or copper of a gold colour.

Set *linseed-oil* on the fire, scum it and put in *amber*, *aloes*, *hepatick*, of each a like quantity, stir them well together till it grows thick; then take it off, cover it close, and set it in the earth for three days; and when you use it strike the metal all over with it, let it dry, and it will be of a golden colour.

### To silver any metal.

Dissolve fine *silver* in strong *aqua fortis*, and put in as much *tartar* finely powdered as will make it into a paste; with which rub any metal, and it will look like fine *silver*.

### To gild so as it shall rot out with any water.

Take calcin'd *oker* and *pumice-stone*, of each like quantities, and a little *tartar*, beat them with *linseed-oil* and five or six drops of *varnish*; strain all through a linen cloth, and with this liquor you may imitate *Gilding*.

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## *To gild paper.*

Grind *bole armoniack* with *rain water*, and give one laying of it when it is dry, take *glair* of eggs, and add to it a little *sugar candy* and *gum water*, which lay over the former, and upon this, when it is dry enough, lay leaf *silver* or leaf *gold*.

## *To gild the leaves of books.*

Take *bole armoniack* eight penny weight, *sugar candy* two penny weight, mix and grind them with *glair* of eggs, then on a bound book (while it is in the press, after it hath been smear'd with *glair* of eggs and is dry'd) smear the said composition, let it dry, then rub it well and polish it; then with fair water wet the edges of the book, and suddenly lay on the gold, press it down gently with cotton, let it dry, and then polish it with a tooth.

## *Of GILDING wood with burnisht gold and silver.*

1. Take parchment *size*, for *priming* or *whiting* the piece, do it over with this seven or eight times, letting it dry between every time.

2. If it is a carv'd frame, that is to be gilded, grind yellow *oker* fine with water, adding to it a little weak *size* to bind it; warm it and colour over the frame, and let it stand to dry.

3. Take either of the *gold sizes*. (See *SIZE*) but rather the seventh, melt it and make it blood-warm; but so as it may be somewhat thin, stir it well with a fine brush, and *size* the piece over twice with it, without touching the hollows, or deepest parts of the carving; because the yellow colour first laid on, is near in colour to the *gold*, and a fault in the *gold's* not taking, will not be so easily cover'd because of the shadows.

4. Let it stand five or six hours to dry, and try if your *gold* will burnish upon it, if not alter your *gold size*, and do it over again.

5. *To lay on the gold for burnishing, do as follows.*

Having fixt your work almost upright, but in a posture a little reclining that the water may run off, and not settle in any of the cavities; lay some leaves of *gold* on your *Gilding cushion*, which hold in your left-hand with your pallat and pencil; let also a basin of water stand by you, and dry *whiting* to rub your knife sometimes with, that the *gold* may not stick to it.

6. Then with a swan's quill pencil, or a large one of camel's hair, being dipt into the basin of water, wet so much of your work as will take up three or four leaves, beginning at the lower part, ascending and *Gilding* upwards, laying on either whole leaves or half leaves, or lesser pieces as the work requires, taking care to make as little waste of *gold* as possible.

7. When you have laid on the *gold* all over what you first wetted, then wet another part of the work, and lay on the leaves  
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of *gold* with your *pencil*, *cotton* or *pallat*, pressing them down close; following this method, till you have finish'd the whole piece.

8. Having done this, look over your work examining if any parts have escap'd *Gilding*, and if there is any such cut some leaves of *gold* into small pieces, and wetting the ungilded parts with a small pencil, apply the bits of leaf *gold* to them, then set the work by for twenty four hours; but no longer, and then begin to burnish it.

9. The *burnishing* is to be perform'd with a tool call'd a burnisher, by rubbing it smoothly on it, till it attains a gloss; and having burnish'd so much of the work as you design, leave the ground of the carving untouch'd, and some other parts which you shall think fit; which being rough, if compar'd with the other, will set off and beautify that which is burnish'd.

10. Those parts which are not burnished, must be clothed or secur'd with *size*, *seed lac*, *varnish* or *lacker*, if you would have it to be deep coloured; but you must take care to touch these parts only, and not that which has been burnish'd.

11. Then the work is to be set off with *lacker varnish*, mixt with *sanguis draconis* and *saffron* or with *ornatto*, with which and a fine pencil touch the hollowness of the carving, hollow veins of leaves and foldings; and if you do not think it deep enough, go over it again, with the *lacker* before directed.

### 12. To lay on silver size.

Take *silver size* newly ground, and mix'd with weak *size*, warm it, and a clear pencil fit for the work, *size* it over once or twice, then let it stand to dry to a just temper, trying it whether it will *burnish*, which if it will, burnish it, but if not, you must *size* it again with some alteration in the *size*.

13. Then wet the work, and lay on the leaf *silver*, after the same manner directed for the laying on of leaf *gold*, and when it has been so done, burnish it over, if it be not frosty weather; but if it be a hard frosty season the priming will be apt to peel off, and the *size* will be apt to freeze in laying on.

14. Let your parchment *size* be something strong and new; for if stale, it loses its strength; nor should you grind any more *gold* or *silver size*, then what you will want for present use.

And be sure to keep your work clean and free from dust both before and after it is *gold siz'd* and *gilded*; otherwise in *Gilding* it will be full of scratches, and look ill.

### The method of GILDING metals.

In order to prepare the *gold* for this work. Take leaf *gold*, or ducket *gold* beaten very thin, and cut into little bits, what quantity you please, put it into a gally-pot, and put to it so much *quicksilver*,

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*quicksilver*, as will just cover it; stir them with a stick and make an *amalgama*, and when you have so done, strain them through a piece of *shammy* leather, squeezing the leather hard with your hand; that which remains behind in the leather, and looks like *silver*, is the *gold amalgamated*, and that which is to be us'd in this work.

*The method of Gilding silver, or brass, copper, or prince's metal.*

1. The thing to be gilded must first be scrubb'd with a wire brush and a little fair water, till it is perfectly clean.

2. Then having put an ounce of *quicksilver* into a vial, drop into it three, four or five drops of *aqua fortis*; with this mixture and a rag rub over the metal to be gilded, till it is every where as white as *silver*.

3. Then with a small knife spread your *amalgamated gold* over the whole piece, taking care not to miss any part of it; then give it a heat over a fire to force the *quicksilver* to evaporate or fly away, and the *gold* will remain sticking close to the piece.

4. But before you give it a thorough heat, let it have two or three little heats, that you may with a small *hair brush*, almost like that of a *comb*, dab and spread the *gold*, which you may the easier do, because the warmth you give it makes the *quicksilver* the more ready to spread; after which give it the thorough heat beforementioned.

5. Afterwards take it from the fire, and with a hair scrub brush, which has never touch'd *quicksilver*, rub and cleanse it as you did before. And you must take notice, if there be any spot left ungilded, you must after you have cleans'd it with the wire brush, proceed again as before.

6. If you would have the work more rich and lasting, besmear it again with *quicksilver* and *aqua fortis*, and lay on the *gold* again, after the same manner as before; and this you may repeat so often till the *gold* lies as thick as your nail upon the metal you gild.

7. *To heighten the colour if you think fit.*

Take *argal*, *salt*, and *sulphur* of each what quantity you think convenient, and put to them as much fair *water* as will just cover the thing that you put into it to be gilded; boil them over the fire, and having ty'd the gilded piece to a string, put it into the boiling liquor for a little space, viewing it every minute; and when it has obtain'd a colour according to your mind, put it immediately into cold water, and it is done.

*Another way to heighten the colour of gold.*

Take *nitre*, *sal-armoniack*, *sandever*, *verdegrease*, *white* and *green vitriol* of each a like quantity, grind them with *white wine vinegar*, which lay over all your work; then lay it on a fire,

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and give it a small heat, that it may smok, and so take it off and quench it in urine.

*Another way to gild silver, brass, &c.*

First cleanse the metal with *aqua fortis*, then quicken your work with *Mercury*, then take off the *gold amalgamated* as before directed, and lay it on with a small knife, spreading it every where, and do in all things as before directed.

*To silver over brass or copper plates, as clock-makers do their dial-plates.*

Procure either leaf or burnt *silver*, and put to it as much *aqua fortis* as will cover it, let it stand an hour or two; then decant off the *aqua fortis* as clean as may be, wash the *silver* three or four times in fair water; and then let it dry, and then mix with it, one part of fine *argal* to three parts of the *silver*, with a little fair water.

When you use this, rub it on the work with a cork, till it is silvered all over, and lies very fair, and afterwards dry it well with a linen cloth, and warm it; then wash it over three or four times with the best white *varnish*, which will preserve it from *tarnishing*, and other injuries of the weather.

*To gild brass, copper, iron or steel, with leaf silver or gold.*

If you would gild *brass* or old *iron*, first cleanse it very well with a *wire brush*; but if it is new *iron* or *steel*, first make it very smooth, and hatch it all over very neatly with a *hatching knife* (which is a knife with a short blade and a long handle).

Then give it an heat on a charcoal fire, so as to make it look *blue*, take it from the fire and lay on the *gold* or *silver*, and burnish it down a little with a blood-stone or burnisher; and then give it the same heat again, and burnish it all over.

This work of *Gilding* may be repeated six, eight, or ten times, still observing to give it the same heat, before you lay on the *gold* and *silver*, and then burnish it as before directed.

*To GILD on WOOD or STONE.*

Beat in a mortar and grind together *bole-armoniac* and *oil of behn*, of each a sufficient quantity, with this smear the *wood* or *stone*, and when it is almost dry, lay on the leaf *gold*; let it dry and polish it.

*To GILD with leaf GOLD.*

Grind leaves of *gold* with a few drops of honey, to which add a little *gum water*, and it will be excellent to write or paint with.

*To GILD so as it shall not rot out with any water.*

Take calcin'd *oker* and *pumice-stone* of each a like quantity and a little *tartar*, pound them with *linseed-oil* and five or six drops of *varnish*, strain all through a linen cloth, and with this liquor you may imitate *Gilding*.

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## To GILD PAPER.

Grind *bole-armoniack* with rain water, and give one laying of it; being dry, take *glair* of eggs, and add to it a little sugar-candy and *gum-water*, which lay over the former, and upon this (when it is in a fit dryness) lay on either leaf *silver* or *gold*.

CLAUDIO GILLE of *Lorrain*, was born in the year 1600, scholar of *Augustino Tasso*, liv'd at *Rome*, excell'd in history, died in 1682, aged eighty-two.

The GILLIFLOWER. To PAINT there are many sorts of *Gilliflowers*, as *white*, *yellow*, *purple*, strip'd, streak'd or variegated with several colours.

For *white* ones cover with *white* and shade with *black*, and a little *indigo*, for the heart of the leaves.

For the *yellow* sort use *masticote*, *gambooge* and *gall-stone*.

For the *purple* sort use *purple* and *white*, finish with less *white*, making them brighter in the heart, and also somewhat yellowish.

For the red sort, use *lake* and *white* and finish without *white*.

For the strip'd and variegated sort, lay on *white* and variegate sometimes with a *purple*, in which *ultramarine* predominates, or sometimes with a *purple* in which *carmine* prevails or *lake*; sometimes with *white*, and at other times without it, shading the rest of the leaves with *indigo*.

The seed of them all is to be done with *verditer* and *masticote*, finish'd with *iris*.

The leaves and the stalks are to be done with the same *green*, mix'd with *iris* to shade with.

To make GILLIFLOWERS grow double of any seed.

Put the seed of a single *Gilliflower* into a *bean*, that the sprout or spire is taken from, so that the *bean* may not grow; stop the hole close with soft *wax*, and set the *bean* into convenient fat mould, and the *Gilliflower* seed, as the *bean* rots, springing up, will produce double flowers, large and beautiful.

To make PINKS and GILLIFLOWERS blue and purple.

Slit a *succory* root, and place the root of your flower; then set it in a convenient bed, and cover it with light mould, and the seed drawing a virtual nourishment from that root, when the *pink*, &c. grows up, it will produce a blue flower.



JACINTO GIMINIANI of *Pistoja*, scholar to *Peter da Cortona*, us'd this mark.

GIOTTO, born in the year 1276, disciple of *Cimabue*, liv'd at *Florence*, excell'd in history, sculpture and architecture, died in the year 1336, aged sixty years.



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**GIO PORTO**, afterwards call'd **GIOSEPPE SALVIATI**, born in the year 1526 or 1533, scholar of *Francesco Salviati*, liv'd at *Venice*, excell'd in history painting, and died aged fifty years.

**LUCA GIORDANO**, call'd **LUCAFA PRESTO**, born in the year 1626, scholar of *Spagnolet* and *Peter de Cortona*, liv'd at *Florence*, *Naples* and *Madrid*, excell'd in history, died in the year 1694, aged sixty eight years.

**GLADIOLA**. To colour this flower lay on *columbine lake* and *white* very pale; then proceed and finish with *lake* only, very bright in some places and very deep in others, always adding *bistre* to it for the strongest shades; let the *green* be *verditer* and shade with *iris*.

**GLASS**. A transparent, brittle, factitious body, produc'd of *salt* and *sand* by the action of fire; of which some learned authors have given us the following characters or properties.

1. That *Glass* is an artificial concrete of *salt* and *sand* or *stones*.

2. *Fusible* by a strong fire.

3. When it is fus'd it is *tenacious* and coherent.

4. It does not *waste* or *consume* in the fire.

5. When it is melted it will *cleave* to iron.

6. When it is red hot it is *ductile*, and may be fashioned into any form; but not malleable, and capable of being *blown* into a hollowness, which no mineral is.

7. It is *frangible* when thin without annealing.

8. When it is cold is *friable*.

9. *Diaphanous*, whether hot or cold.

10. It is *flexible* and *elastic*.

11. It is *dissoluble* by cold and *moisture*.

12. It is only capable of being cut with *diamond* or *emery*.

13. It will receive any *colour* or *dye*, both externally and internally.

14. It is not *dissoluble* by *aqua fortis*, *aqua regia* or *Mercury*.

15. Neither *acid juices*, nor any other matter extract either *colour*, *taste* or any other quality from it.

16. It will admit of *polishing*.

17. It will neither lose of *weight* or *substance*, by the longest or most frequent use.

18. It will give *fusion* to *metals*, and *soften* them.

19. It is the most pliable thing in the world, and will best retain the form that is given it.

20. It is not capable of being *calcin'd*.

21. An open *Glass* fill'd with water in the summer time will gather drops of water on the outside, so far as the water on the inside reaches; and the breath of a man blown upon it will manifestly moisten it.

22. Little

22. Little balls fill'd with water, *Mercury* or any other liquor, and thrown into the fire, as also drops of green *Glass* being broken, will *fly asunder* with a great noise.

23. Neither wine, beer, or any other *liquor* will make it *musty*, or *change its colour* or *rust* it.

24. A drinking *Glass* partly fill'd with water, and rubb'd on the brim with a wet finger, will *yield beautiful notes*, higher or lower as the *Glass* is more or less full, and will make the liquor frisk and leap.

The materials us'd in the composition of *Glass*, as has been observ'd, are *salt* and *sand* or *stone*.

The *salt* is of the fix'd kind, such as will not evaporate with the most intense heat; the *sand* or *stone* must be such as will melt easily, this is what gives firmness and consistence to the *Glass*.

1. This *salt* is procured chiefly from a kind of *ashes*, call'd *polverine* or *rochetta*, brought from the *Levant*, and particularly from *Alexandria* and *Tripoli*.

The *ashes* are made of a vegetable growing in great abundance in the country, commonly call'd *Kali*, and also *Soda* and *Saltwort*, from its saline taste, and also *glass-weed*, from the use made of its *ashes* in making *Glass*.

To get the *salt* from this *polverine*, they pulverize and sift it very fine; then boil it in a brass copper, with fair water and *tartar*, till a third part of the water is consum'd, taking care to stir it from time to time.

Then filling up the copper with fresh water, they boil it a second time till half be consum'd; when this has been done, there remains a *lee* impregnated with *salt*. To get the *lees* from the *salt*, they boil them, till the *salt* shoots at the top, which they scum off as it rises; an hundred pounds of *ashes* this way usually yields eighty or ninety of *salt*.

When the *salt* is dry they beat it grossly, and put it into a furnace to dry it farther with a gentle heat. When it has been sufficiently dried, they pound and sift it very fine, and lay it by to make frit. See FRIT.

But you must also take notice, that besides the *ashes* of *kali*, those of *fern* will also yield a *salt*, which will make excellent *Glass*, in nothing inferior to that of *polverine*.

The method of preparing the *ashes* of *fern* is the same as that of those of *kali*.

The *ashes* also of the *cods* and *stalks* of *beans*; as also of *coleworts*, *bramble-bush*, *millet-stalks*, *rushes* and many other plants may be us'd for the same purpose.

2. As for *stone*, which is the second ingredient in *Glass*, the best of which is that which will melt, is white and transparent. This

fort of *stone* is found chiefly in *Italy* and is call'd *tarso*, and is a kind of marble; the next is *quocoli* or *cuogele* a sort of pebbles, found at the bottoms of rivers.

Indeed nothing makes finer and clearer *Glass* than flint; but the charge of preparing it deters *glass-makers* from using it; the preparation necessary for *stone*, is to calcine, powder and searce it.

*Anthony Neri* observes, that all white transparent *stones*, which will not burn to lime, are fit to make *Glass*; and that all *stones* which will strike fire with steel, are fit for making *Glass*. But *Dr. Merret* objects against this last rule as not holding universally.

Where *glass-makers* cannot easily have proper *stone*, they make use of *sand*, the best for the use is that which is white and fine; for green *Glass* that which is harder, and more gritty.

The preparation that it needs is only washing it well.

*Maidstone* in *Kent* furnishes our *glass-houses* with white *sand* for their crystal *Glass*, and with the coarser for green *Glass*.

The method of making white and CRYSTAL GLASS.

There are three sorts of furnaces us'd in making *Glass*, the one to prepare the *frit*, call'd the *calcar*; a second to work the *Glass*; and a third call'd the *leer*, to anneal it. See the article FURNACE.

For the making *crystal Glass*, take of the whitest *tarso* pound-ed small, and searced as fine as flower, an hundred pounds to *polverine* sixty five pounds.

Mix them well together, and put them into the furnace call'd *calcar*, first heating it. Keep a moderate fire for an hour continually stirring the materials, that they may incorporate and calcine together.

Afterwards increase the fire for five hours; after which take out the matter, which being now sufficiently calcin'd is call'd *salt of frit*, which is also call'd *bollito*.

Take the *frit* out of the *calcar*, lay it up in a dry place, keep it cover'd from the dust; and let it lie for three or four months.

To make the *Glass*, take of this *crystal frit*; set it in pots into the furnace, adding to it a proper quantity of *manganese*, (See MANGANESE,) when they are both fus'd or melted, cast the fluor, (*i. e.* the melted matter) into fair water, to purify it from the *salt* call'd *sandever*, which if not cleared from it, would make the crystal obscure and cloudy.

This lotion or washing must be repeated several times, till the crystal is fully purg'd.

When this has been done, let it boil for four, five, or six days; then try whether it has had *manganese* enough, and if it look still greenish, add more *manganese*, by little and little at a time

time with discretion ; but be sure to take care not to overdose it, because the *manganese* inclines it to a blackish hue.

Then let the metal clarify till it becomes of a clear and shining colour ; which when it comes to, it is fit for blowing or to be form'd into vessels at pleasure.

There are three principal kinds of *glasses*, distinguished by the form or manner of working them, *viz*, 1. Round *Glass* as these of our vessels, phials, drinking *glasses*, &c. 2. Table or *window-glass*, of which there are various sorts, *viz*. *crown-glass*, *jealous-glass*, &c. and *plate-glass* or *looking-glass*.

*The method of working or blowing* ROUND GLASS.

The working furnace being round has six *boccas* or apertures ; at one of which call'd the great *bocca* the furnace is heated, and the pots of *frit* set in the furnace ; two other smaller holes call'd *boccella's*, serving to lade or take out the melted metal, at the end of an iron to work the *Glass*. At the other holes are put in pots of other fusible ingredients to be prepar'd, and at last emptied into the lading pot.

There are to be six pots in each furnace, all made of tobacco-pipe clay, proper to sustain not only the heat of the fire, but also the violent effects of the *polverine*, which penetrates every thing else.

But two of these pots are wrought at, the rest serving to prepare the matter for them.

The fire of the furnace is made and kept up with dry hard wood, cast in without intermission at the six apertures. This is never omitted, even upon the most solemn days.

When the matter contain'd in the two pots is sufficiently vitrified, then they are wrought, by taking out the metal, blowing and fashioning it.

The metal having been now sufficiently refin'd, the operator or servitor takes his blowing iron, which is a hollow tube about two foot and a half long, or longer, and dipping it in the melting pot, there turns it about ; and the metal sticks to the iron, like some glutinous or clammy juice, much like, but more firmly than *Venice* treacle.

For each *Glass* he dips four times, and at each dip rolls at the end of his instrument, with the *Glass* upon it, on a piece of iron, over which is a vessel of water ; the coolness whereof helps to consolidate the *Glass* more readily, and disposes it the better to bind with the next to be taken out of the pot ; when the operator has dipt the fourth time, and there is now metal enough upon the blowing iron, he blows gently through the iron, by which he raises or lengthens it nearly a foot, after the manner as is done by blowing in a bladder or globe ; and to give it a polish, he rolls it to and fro on a stone.

Then he blows again a second time, and thus forms the bunch or belly of the *Glass*. The matter by this second blast assumes the figure of a gourd or calabash eighteen or twenty inches in diameter.

As often as the operator blows into the iron (which must be very often) he removes it hastily from his mouth to his cheek, lest he should draw the flame into his mouth, when he applies it again to the iron.

Then he whirls the iron many times round his head to lengthen and cool the glass; sometimes the *Glass* being thus blown round is return'd to the fire, where it flattens a little of itself, when flatted it is taken out and cooled; and if it be requir'd as to the form intended, the workman flattens the bottom a little, by pressing it on the marble, or he moulds it in the *stamp-irons*; and thus delivers it to the master workman to break off the *collet*.

The *collet* or neck is the narrow part which clove to the iron: to set the *Glass* at liberty they put a drop of cold water on the *collet*, which by its coldness cuts or cracks a quarter of an inch; after which by giving it a slight knock, the fracture is communicated all round the *collet* it drops off; the waste piece of *Glass* is knock'd off the iron and thrown by to make green *Glass*.

This being done the iron-rod or *ponteglo* is dipt into the melting pot, and with the matter that sticks thereto, they apply and fasten it to the bottom of the vessel, opposite to the *collet*.

The vessel thus sustain'd by the iron-rod is carried to the great *bocca* to be heated and scalded, and while another person takes care thereof the former operator rests, and prepares himself for the *branching*.

The *branching* is making the bowl; to do this they thrust in an iron instrument call'd *passago*, and augment and widen the aperture opened thereby with the *procello*.

In turning this instrument about to form the bowl, the edge becomes thickned, the glass being as it were doubled in that part; whence the hem observ'd on the circumference of our *glasses*. What is superfluous they cut off with shears.

The vessel being thus opened is return'd to the great *bocca*, where it is sufficiently heated a second time; and then the operator gives the bowl its finishing, by turning it about with a circular motion; which it increases in proportion as the bowl opens, and enlarges by means of the heat and agitation.

The *Glass* being thus finish'd is carried from the *bocca*, still being turn'd round to a kind of earthen bench covered with brands or coals extinguish'd, here they let it cool a little, and come to its consistence; having first separated it from the iron-rod by a stroke or two with the hand.

Thus

Thus by *blowing, pressing, scalding, amplifying* and *cutting* the *Glass* is brought into the form that the workman had first design'd in his mind.

When a number of them has been finish'd by the master, and if the vessel requires it, he puts on a foot and handles, &c. and with the *spici* puts on rigarines and marblings. Then a servitor takes them in an iron fork, and places them in the tower of the *leer* to anneal and harden.

What has been here said of white or *crystal Glass*, is the same as to the making of common or green *Glass*, the working part being the same in all, the difference being in the *polverine* or *salt* made use of.

So many masters as there are, so many pots, at the least, and so many *bocca's* there must be, each man having his proper station; where, says Dr. *Merret*, they receive those scorching heats, falling directly into their faces, mouths and lungs; whence they are forc'd to work in their shirts, with a straw broad brim'd hat on their heads, to defend their eyes from the excessive heat and light. They sit in large wide wooden chairs, with two long elbows, to which their instruments are hung.

They work six hours at a time, measured by a single *Glass*; after which they are reliev'd by others, for the like time, so that the furnaces are never idle.

#### *The method of working or blowing* WINDOW or TABLE GLASS.

The method of making crown window glass, now practised in *England*, is said to have been borrowed from the *French*.

An *English* glass-maker going over, wrought in *France* on purpose to let himself into the secret; which when he had attained to, he came back, and set up a glass-work, wherein he far excell'd the *French* his teachers.

This glass is blown much after the same manner as looking glass, as follows:

The furnace, melting pots, materials, and fire are the same for *window* and *table* glass as for *round* glass; and the difference in the operation only begins after the servitor has dipt his blowing iron the fourth time in the melted metal.

The glass then being in this state, is blown; but instead of rounding or forming it into a bunch, the particular motion the workman gives it in the directing and managing the wind, and the way of rolling it on the iron, makes it extend in length two or three foot, and form a cylinder which at first is but two inches diameter; but which by being apply'd to the fire again, and blown afresh after taking out, becomes of the extent required for the table glass to be form'd; but with this circumstance,

circumstance, that the side which is fastened to the iron goes gradually diminishing, and ends in a kind of cone or pyramid.

To render the two ends nearly of the same diameter, after adding a little glass to that opposite to the iron, they draw it out with a pair of iron pinchers.

Then they cut off the same end with a little water, and carrying the cylinder back to the *bocca*, they incise it likewise with water in two other places; one eight or ten inches from the iron, and the other the whole length.

Both the extremities of the glass cylinder being thus taken off, it is heated on a kind of earthen table somewhat rais'd in the middle, in order to promote its opening at the place incised or cut lengthways.

In this the workman makes use of an iron, wherewith he alternately lowers and raises the two sides or halves of the cylinder, which now begin to open and unfold like a sheet of paper, and at length grow perfectly flat.

The table of glass is now in its last perfection, and needs nothing farther but to be heated over again; which when it is taken out, it is laid on a table of copper, where it having lain till it has cool'd and come to its consistence, it is carried on forks to the tower of the furnace, where it is set to anneal for twenty-four hours.

Formerly the tables were set into the the annealing tower in great numbers, perhaps an hundred at a time in a perpendicular situation, which was the occasion that those set in first, bearing in some measure the pressure of all the last, were bent, and thus rendered unfit for use; but a way has been since found out to remedy this inconvenience by separating them into tens, with an iron shiver, which by dividing the weight, diminishes it, and by that means preserves the tables as flat as when they went in.

*Of the different sorts of table or window GLASS.*

There are divers sorts of this glass made in divers places for the use of building.

*Crown Glass* of which there are two kinds, distinguished by the places where they are wrought, viz.

1. *Ratcliff* or *Cock-hill crown glass*, which is the best and clearest, and was first made at the *Old Bear-Garden* at the *Bank-Side, Southwark*. Of this there are twenty-four tables to the case, the tables being of a circular form, about three foot six inches in diameter.

2. *Lambeth crown Glass*, which is of a darker colour than the former, and inclining to green.

*French Glass*, call'd also *Normandy Glass*, and formerly *Lorraine Glass*, because made in those provinces. At present it is made



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made wholly in the nine glass-works in *Frante*, of which five are in the forest of *Lyons*, and four in the county of *Eu*, the last at *Beaumont*, near *Rouen*. This is of a thinner kind than our crown glass, and when laid on a piece of white paper, appears of a dirtyish green colour. There are but twenty-five tables to the case.

*German Glass* is of two kinds, *white* and *green*; the first is of a whitish colour, but subject to those small curved streaks, observed in our *Newcastle Glass*, tho' free from the spots and blemishes thereof. The green, besides its colour, is liable to the same streaks as the white, but both of them are straiter and less warp'd than our *Newcastle Glass*.

*Dutch Glass* is not much unlike our *Newcastle Glass*, either in colour or price. It is frequently much warp'd like that, and the tables are but small.

*Newcastle Glass* is what is most us'd in *England*. It is of an ash colour, and subject to specks and streaks and other blemishes, and besides is frequently warp'd. There are forty-five tables to the case, each containing five superficial feet; but some say thirty-five tables, and six foot in each table.

**GLASS to join.** Quench unslack'd *lime* with *wine*, and pound it to a fine powder; mix with it *figs* and *swine's grease*, and afterwards work them well together. This will join broken pots or any thing together. Or,

Take *Greek pitch*, *rosin*, and the powder of little stones; mix these, and heat them over the fire, and you may join any thing with them. Or,

Take froth of glue, call'd *spuma ferri*, a quarter of a pound, *tile shards* powdered half a pound, of unslack'd *lime* one pound, and as much linseed oil as will mix and work them together. This glue neither yields to water nor fire.

*To tinge GLASS of a deep red.*

Opake colours have a body, but the transparent ones none; for which reason this deep red must be mix'd with matters that give it one, as shall be shewn.

Take twenty pounds of *crystal frit*, one pound of pieces of *white glass*, and two pounds of calcin'd *tin*; mix the whole well together, and put it into a pot, and set it in a furnace that it may purify.

When it is melted, cast in an ounce of *calcin'd steel* well pounded, and an ounce of scales of *iron* from the anvil well pulveriz'd and mixt together, and keep stirring the glass well with an iron stirrer, while you are putting in the powder, to hinder it from rising too much.

You must take care not to put in too much of the powder, for that would make the glass black, whereas it ought to be clear, shining, and of an obscure yellow colour. Then

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Then take about fix drams of calcin'd *copper* prepar'd, cast it upon the melted glafs, often mixing it two, three or four times, and the glafs will be as red as blood.

If the colour be as you would have it, you must work it off presently, for fear it should turn black, and the colour be lost, of which great care must taken.

But if notwithstanding this the colour comes to be lost, you must add more scales of *iron* in powder, and it will return.

*To make a PEACH colour in GLASS.*

To make this colour, which is a very agreeable one, take glafs prepar'd and ting'd of a milk white, and when it is in good fusion, put in some *manganese* of *Piedmont* prepar'd, and that by little and little, stirring the matter well at each time, till the colour becomes as fine and perfect as you desire it; but you must work the glafs in time, otherwise the colour will be lost; but by so doing, you will have a very fair peach-colour.

*To make a GOLD yellow in GLASS.*

Gold colour being one of the most noble and finest we can make, by reason of its imitating the most perfect metal in nature, must be made with the purest materials and greatest precaution.

Take two parts of *crystal frit*, made with *tarso*, and not with *sand*, which is not so good, and one part of *frit* compos'd of two thirds of *tarso*, and one third of fine salt of *polverine* prepar'd; pound and mix them well, and to each fifty pounds of this composition, add half a pound of *tartar* purified, pounded, and searced fine, and half a pound of *manganese* of *Piedmont* prepar'd, mixing these powders well with the two *frits*, because you must not cast them on the melted glafs as in other colours. Then put the whole by little and little into a pot, and set them in a furnace, in which let them stand at an ordinary fire four days, for fear the *Glass* rising should run over.

When that matter is well purified, you may use it for making vessels, and what other works you please, which will be of a fair colour.

If you would have the colour yet clearer, you must add more powder, and you will have a very fine golden colour.

If you would have it yet finer, take fine *crystal frit* made of *polverine* of *rochetta*, and the golden colour will be yet more fair.

*To give GLASS the colour of LAPIS LAZULI.*

*Lapis Lazuli*, which is a fine blue, and full of veins of gold, will not be easy to imitate, without a great deal of care and industry in its preparation.

To make this fine colour, you must use the same matter as for the fine white; and when it is in fusion in the pot, you must add to it by little and little, the *blue enamel* in powder,

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which is made use of by painters, mixing the whole well together each time, and that as often as there is occasion to make this colour.

Then try it, whether the colour is to your mind, and when it is, let it stand for full two hours, and make a second essay of it; if the colour be perfect, let it stand ten hours, and then mix it again.

If it keeps in the same estate without changing the colour, you may employ it in making what vessels you please, which will be of the true colour of *Lapis Lazuli*.

If in working this glass it happens to rise, you may cast in a little *leaf gold*, which will make the glass approach yet nearer to *Lapis Lazuli*, and which will in a moment stop the rising of the metal, as sugar will do in boiling oil.

*To make a MILK WHITE colour in GLASS.*

To make the milk white colour well, requires no less exactness than the *blue*.

To succeed in it, take twelve pounds of good crystal frit, two pounds of calx of *lead* and *tin*, one of each, and half an ounce of *manganese* of *Piedmont* prepar'd; the whole being pulveriz'd and mixt together, put them into a pot heated in the furnace; let it stand there for twelve hours, then mix the whole well and make an essay of it.

If the colour don't please you, add to it some *calx* of the two metals beforementioned, which incorporate with the glass, mixing it well. In eight hours time after the glass will be fit to work, and white as milk.

*Another fairer and whiter colour.*

This second way of giving a milk white colour to glass is much better than the precedent, and the work more exquisite.

We only make use of calx of *tin*, without mixing any *lead*, and we put fifteen pounds of that *calx* to a hundred pounds of pure *crystal frit*, with twelve ounces of *manganese* of *Piedmont* prepar'd; the whole being well pulveriz'd and mix'd, put it into a pot heated in the furnace, there to purify during eight days.

Then cast the matter into water, the better to purify it; then after it has been dry'd, put it into the same pot to be melted again.

If it be transparent, you must add three pounds twelve ounces of the same calx of *tin* as before, mixing it well with the melted metal, to make it the better incorporate; and in twenty-four hours it will be finer and whiter than snow, and fit to be wrought.

*To make common GLASS become white and CRYSTAL-LINE.*

If you put in a convenient pot *frit* of *polverine*, you will have a common *white glass*.  
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If you add *salt of rochetta* to this *fritt*, you will have a very fair *crystal glass*, which will be between *ordinary glass* and *crystal*.

To make it very fine, you must add the same dose of *manganese* of *Piedmont* prepar'd as for *crystal*; for the *manganese* takes away all greenness in the glass, and makes it very white.

If you would have a very fine glass, you must always cast the crystalline matter into water; you may also do the same by common glass to bring it to perfection.

When this has been done, put the matter into the pot again, and when it is melted, put it again into water, repeating this till it be purified and made fine.

To have glass finer than ordinary, this casting of it into water must be very exactly observ'd; for besides its whitening, it is there calcin'd and purified, and has fewer blisters and pustles.

But to raise the matter to the greatest perfection, mix fifty pounds of *crystalline glass*, and as much common, and put to it ten pounds of purified salt of *tartar*; that will give a *glass* and *crystal* more than ordinary fine, provided you always take care not to mix it with the *collets* of the glass, which has touch'd the iron rod; for they always make the glass blackish, and are only fit for green glass.

*To make marble colour in GLASS.*

White marble being very simple, it is easy to imitate; the way of doing it only requires *crystal frit*, which must be wrought as soon as it is melted, before it be purified, for so it will give a very fair marble colour.

*The following account of the colours for painting on GLASS we have from the celebrated M. Felibien.*

*For BLACK.* Take two thirds of flakes or scales of *iron*; beat them up, and mix them with one part of *rocaille*, or little glass beads.

*For an azure BLUE.* Proceed as in the *green*, only leaving out the *æs ustum*; instead of it, use *sulphur*.

*For CARNATION.* Use *feretto* and *rocaille*.

*For colours of HAIR, TRUNKS of trees, &c.* Take *feretto*, *rocaille*, &c.

*For GREEN.* Take *æs ustum* one ounce, *black-lead* the same quantity, and four ounces of *white-sand* incorporated by fire; to which, after calcination, add a fourth part of *salt-petre*; then calcine again, adding a sixth part more; after which it is usual to give it a third coction before it is used.

*For PURPLE.* Proceed as in the *green*, only leaving out the *æs ustum*, and instead thereof use *perigueux*.

*For RED.* Take *litharge* of *silver*, and scales of *iron*, *gum arabick*, *harderia*, *glass beads*, and *blood stone* nearly in equal quantities. This is one of the most difficult colours, and the preparation is not to be learn'd but by experience.

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*For VIOLET.* Proceed as for *green*, but leaving out the *æs uftum*, and instead of it use both *fulphur* and *perigueux*.

*For WHITE.* Take *sand* or little white *pebbles*, calcine them, pound them in a mortar, and afterwards grind them on a marble with one fourth part of *salt-petre* added to them; calcine the mixture, and pulverize it over again, and when you are ready to use it, add a little *gypsum* or *plaister of Paris*, &c.

*For YELLOW.* Grind *leaf-silver*, mix it up in a crucible with *fulphur* or *salt-petre*; then having well beaten or ground it on a porphyry stone, afterwards grind it over again with nine times the quantity of *red oker*.

### PAINTING or STAINING GLASS.

The antient or primitive manner of painting glass was very simple, and consequently very easy; it consisted in the mere arrangement of pieces of glass of different colours in some sort of symmetry; and constituted what is now call'd MOSAIC work.

In process of time they came to attempt more regular designs, and also to represent figures heightened with all their shades; yet they proceeded no farther than the drawing the contours of the figures in black with water, and hatching the draperies after the same manner on glasses of the colour of the object they designed to paint.

For the *carnations*, they us'd glass of a bright red colour, and upon this they drew the principal lineaments of the face, &c. with black.

But in time the taste for this sort of painting improving considerably, and applying the art to the adorning of churches, basilicks, &c. they found out means of incorporating the colours in the glass it self, by heating them in the fire to a proper degree, having first laid on the colours.

The first notion of this is said to have been given by a *French* painter of *Marseilles*, after he had been at *Rome*, under the pontificate of *Julius II.* But the first who carried it to any heighth were *Albert Durer* and *Lucas Van Leyden*.

The colours us'd in painting or staining of glass are very different from those us'd in painting either in water or oil colours.

In the windows of antient churches, &c. there are to be seen the most beautiful and vivid colours imaginable, which far exceed any of those us'd by the moderns; not so much because the secret of making those colours is intirely lost; as that the moderns won't go to the charge of them, nor be at the necessary pains, by reason that this sort of painting is not now so much in esteem as it was formerly.

Those beautiful works which were made in the glass-houses were of two kinds.

In some the colour was diffus'd through the whole substance of the *glass*; in others, which were the more common, the colour was only on one side, scarce penetrating even the surface more than one third of a line, tho' this was more or less according to the nature of the colour, the yellow being found always to enter the deepest of any colour.

These last, though not so strong and beautiful as these mentioned before, were of more advantage to the workmen, because that they could on the same glass, tho' already coloured, shew other kind of colours, where there was occasion to embroider draperies, enrich them with foliages, or represent other ornaments of gold, silver, &c.

In order to this, they made use of *emery*, grinding or wearing down the surface of the glass, till such time as they were got thro' the colour to the clear glass; this done, they apply'd the proper colours on the other side of the glass.

By this means the new colours were hindred from running and mixing with the former, when they expos'd the glasses to the fire as will appear hereafter.

When the intended ornaments were to appear *white*, the glass was only bared of its colour with *emery*, without tinging the place with any colour at all; and this was the manner by which they wrought their lights and heightenings on all kinds of colours.

The first thing to be done, in order to paint or stain glass in the modern way, is to design and even colour the whole subject on paper.

2. To chuse pieces of glass proper to receive the several parts.

3. To divide or distribute the design itself or papers it is drawn on into pieces suitable to those of the glass, always taking care that the glasses may join in the contours of the figures, and the folds of the draperies.

4. To order them so that the carnations may not be impair'd by the *lead*, with which the pieces are to be join'd together.

5. Having made the distribution, take care to mark all the glasses as well as papers, that they may be known again.

6. Then applying each part of the design upon the glass intended for it to transfer the design upon the glass with the black colour diluted in *gum water*, by tracing and following all the lines and strokes, as they appear thro' the glass with the point of a pencil.

7. Then the glasses must be set by till they are thoroughly dry, which will be in about two days; then the work being in black and white, is to have a slight wash over with *urine*, *gum arabick*, and a little *black*, and repeated several times, according

as the shades are desired to be heightened, with this precaution, never to apply a new wash till the former is sufficiently dried.

This done, the lights and risings are given by rubbing off the colour in their respective places, with a wooden point or the handle of the pencil.

Then having all your colours in a readiness, fill your pieces with colours, for which use the nib of the pencil, especially in carnation, where you must be very exact; you must also be very circumspect and expeditious, and take a great deal of care not to blot or blur the tracings, and choose rather to paint on the other side of the glass.

All the colours, except yellow, may be applied on the same side, and that you must do on the contrary side, because it is apt to mingle with the other colours, and if near the blue, will compose a green; so that for want of such precaution, the whole work may be spoil'd; if the yellow transmit it self perfectly through the quarre, it is as well as if it had been done on the same side; and take notice by the way, that the other colours have not so ready a transiion, because they consist of a grosser body.

The yellow ought to be very equally and justly laid on in a greater or lesser quantity, as you would have your shadows; observe this too in the rest, especially to lay them on as quick as possible, as we have already said, particularly the azure green and purple require the most exactness of any.

Now to set off and heighten the lights, in piling a beard, describing hair in drapery, or otherwise, use the handle or butt end of the pencil, a small pointed stick or quill, wherewith take off the colours in those places you would enlighten, which is easily done.

Such works as are done in grisaille, you must paint after this manner: trace your piece with black, and let it dry for two days intirely; do it over very lightly and equally with a wash so thin laid on as not to efface the first lines, and let it dry for two days; after this, run them over again with the same wash where you find it convenient to give a second tinge, and let it dry two days longer; then to give it the lights and convenient heightening, take the sharp butt end of your pencil or pointed stick or pen as before, and take off the colour of the first wash in the most necessary places, and so your work will be finished.

To make this wash is easy; take a small pewter cup or other vessel, and put therein a quantity of black colouring; then dissolve *gum arabick* powdered in its weight of wine, throw this on the black in the pewter dish or sawcer, that it may be very



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clear and not easily dried, and that you may have your wash for painting glass in grisaille or gray.

*A furnace for painting the GLASS and settling the colours.*

This furnace must be square, of good brick, two foot high, and so much every way, and have three divisions; the undermost for the ashes must be six inches high, the middle one for the fire and to put in the fuel must be six inches high, and have its opening five or six inches broad and four deep, with a good iron grate of three square bars of iron which cross the furnace and divide it in the middle to support the earthen stove hereafter described; the uppermost division must be a foot high, with a little opening about the middle before of four inches high, and two wide, to put in and draw out the ware a baking, to see if it be well done.

In this uppermost division must be put the aforesaid stove of good fire-proof crucible earth, the bottom an inch and a half thick, and from thence up to the brim ten inches full; it must be square as the furnace, and have two inches room on all sides, that the fire may flame round about it to bake the work, therefore placed exactly in the middle of the furnace. There must be also in the fire part of this stove, an opening just against, and of the same size and form as that of the furnace, for the conveniency of putting the ware in and out.

Take this method of distinguishing the furnace in all its parts, and to lay down a clearer description thereof, observe:

The letter A is the ash hole for the ashes that fall from above thro' the iron grate; and note, that the wider the opening is, the more violent the fire will be.

The letter B is the fire place.

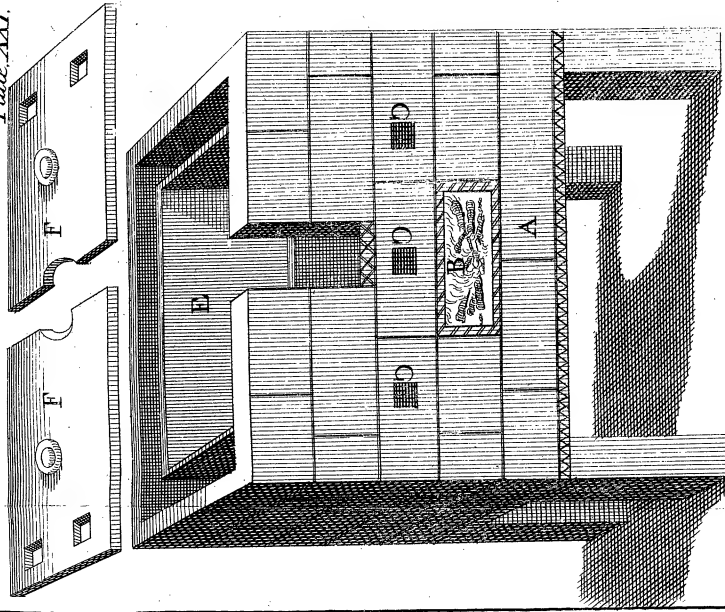
The letters C are the three square iron bars to support the pan for the ware.

The letter D is the opening of the furnace and pan, through which the ware must be conveyed in and out.

The letter E is the earthen pan, wherein all the painted ware must be baked.

The letters F are two half lids of potters earth for covering the whole furnace above. As soon as the stove is full of ware, they must be well closed and luted together, to prevent the air coming in any where but by the four square holes at both ends of the lid, and the two semicircles in the middle, in which make a round hole for a chimney, when the two half lids are closed. These five holes are for letting out the smoke and flame of the furnace.

Plate XXI.





## G L A

### *To make white ground for painting on GLASS.*

Now to pursue our work, we will begin with the preparation of all the colours to be used in painting glass; for before we proceed to prescribe the rules how to work, the materials must be considered.

The white is compounded of several ingredients; the first are small white river pebble-stones heated red hot over a fire in an iron ladle, and thrown afterwards into an earthen dish full of cold water to calcine them; and this must be repeated several times until they be prepar'd; afterwards being dried, pound them with a stone or glass pestle in a stone mortar, and so grind them upon a marble to an impalpable powder; then mix a fourth part of *nitre* with it, and calcine them in a crucible; then pound and grind them again, and calcine them a third time over a smaller fire than your former, and so take them off for use.

This done, when you would paint with it, add equal parts in weight of *gyp*, a sort of talk found amongst plaster mold baked on the coals to a whiteness, and reducible to powder, and *rocaille*, (See ROCAILLE) grind them all three well together in a hollow plate of copper with *gum arabick* water. Thus you'll have your white in good condition to paint withal.

### *To prepare black for painting on GLASS.*

As this colour cannot be omitted in any sort of painting, so in this, the manner of using it is much the same, and the preparation easy.

You must grind scales of iron from the smith's anvil-block for three hours on the shallow copper basin or plate; add to this one third of the same weight of *rocaille*, with a little calx of *copper*, to hinder the iron from turning red in the fire; grind it to as impalpable a powder as you can bring it to, and so keep it in a close vessel for use.

### *To prepare a yellow paint for GLASS.*

This colour requires a more costly preparation than the precedent, because it cannot be well done without a tenth part of prepar'd silver, as is shewn hereafter.

Take fine silver in plates or leaves, stratify them in a crucible with powder of *sulphur* or *nitre*, the first and last lay being of the powder, and so calcine them in a furnace; this done, cast it out as soon as all the *sulphur* is consumed into an earthen basin of water, and afterwards pound it in your stone mortar until 'tis fit for the marble, and so grind it with some of its water wherein it was cooled for six hours; then add nine times its weight of red *oker*, and grind them together for a full hour and it's done, and fit for painting on glass.

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### *To make a blue for painting GLASS.*

The whole secret of this preparation depends on the calcining the ingredients, and goodness of the crucible.

Take two ounces of *zaffer*, two ounces of *minium*, and eight ounces of very fine white sand; put all these into a bell-metal mortar, and pound them very well, and so into a crucible covered and luted over a quick fire for an hour; then draw out the crucible, and pound them again as before; this done, add a fourth of its weight in *salt-petre* powdered, and having mixt all very well together, return them into a crucible covered and luted, which place again in the furnace for two hours at least, continuing such another fire as the former. The crucible being off, and cooled a second time, grind the mass as before, and so put it into a crucible again, with a sixth part of *salt-petre*, and let it remain on the fire for three hours; then take off the crucible immediately with an iron spatula red hot, and take out the matter lest it should stick, being very clammy and hard to be emptied.

'Tis convenient to have strong crucibles for this calcination, because it remains so considerable a while in the fire, and they must be luted with an extraordinary lute, adding powder of *borax* to the powder of glass vitrified, which helps the fusion of the glass which we have omitted there; but the greatest stress lies in baking the crucible afterwards in a small fire to cement the pores, and make the earth compact as glass, which would be very much furthered if you would throw on it a considerable quantity of *salt* as it comes out of the fire. This would glaze it, and capacitate it for retaining the spirits in the fire.

### *To make a red colour for GLASS paint.*

This requires as much caution as the blue.

You must take scales of *iron* and litharge of *silver* of each a dram, *feretto* of *Spain* half a dram, *rocaille* three drams and a half; grind all these for half an hour on a shallow copper plate; in the mean time, pound three drams of *blood-stone* in an iron mortar, and add it to the rest; then pound a dram of *gum arabick* in that mortar to an impalpable powder to take off the remains of the *blood-stone*, and so add it to the rest, grinding them still continually, lest the *blood-stone* be spoiled.

The best manner of grinding these is to pour water by little and little on the ingredients as you grind them, neither wetting them too much nor too little, but just as much as will keep a good temper, as for painting; afterwards put all into a foot glass, and so drop on it through a small hollow cane of wood or with your finger, as much water as will bring it to the consistence of an egg's yolk butter'd, or a little more; then cover

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the glass to preserve it from dust, and so let it stand three days to settle.

After this, decant the clearest and purest of the colours that rise at the top into another glass, without disturbing the sediment; and two days after it has settled anew, pour off again the purest of the colours as before.

This done, set it in the body of a broken mattress or bolt-head over a gentle slow fire to dry easily, and so keep it for use.

When you have occasion for it, take a little fair water in a glass, and with it, moisten as much colour as you think convenient; that will be excellent for carnation. As for the *fæces* which are very thick, dry them too, and you may moisten these in like manner with water for drapery, timber colour, and such other as you think convenient.

It is true all painters of glass don't use these colours thus prepar'd, there being few artists of that kind, who have not invented their own particular colours, which they esteem as great secrets.

But nevertheless they that have been above describ'd are sufficient for the best paintings of all sorts, provided the workman has but the skill to manage them.

*To make a purple colour for painting of GLASS.*

The preparation of this purple colour is exactly like that of the blue, for this reason we need not use any tedious repetitions.

You must take an ounce of *zaffer*, and an ounce of very pure and clear *perigueux*, two ounces of *minium*, eight ounces of very fine and white sand; pound all these in a bell-metal mortar, and reduce it to an impalpable powder; put it afterwards into a good crucible well covered and luted in the furnace; keep a very good fire to it for an hour; then draw it out, and as soon as it is cold, pound the mass over again in the same mortar; to this add a fourth part of its weight of *nitre*; mix them together, and put them into a crucible, and so proceed until you have a fine purple colour.

*To make a green paint for GLASS.*

The change of the ingredients makes this colour, but the method for incorporating them is the same as the former.

Take two ounces of *æs uftum*, to this add two ounces of *minium*, and eight ounces of very fine white sand; pound these together in a metal mortar to an impalpable powder, and put it afterwards in a crucible luted and covered into a wind furnace, giving it a good fire for an hour; after this, draw it off, and let it cool; then pound it again, adding a fourth part of its weight of nitre in powder; grind and mix them well together, putting

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them afterwards into crucible luted and covered in the furnace for two hours, and then you'll have a very fine green.

*Of other colours in general for painting of GLASS.*

We have directed how to make the first master-colours for painting on glass; now we proceed to shew what other depend on them without enlarging on these preparations.

The red serves for carnation, but there ought to be one part of *feretto* of *Spain* in the composition, and another of *rocaille*; grind these on your copper plate, imbibing the powder with gum'd water until it be made fit for use.

The red *fæces* there also mentioned will serve in drapery; and to describe timber work, trunks of trees, hair, brick and such other things, you must take an ounce of *feretto* of *Spain* as in the former composition, an ounce of *iron scales*, and two ounces of *rocaille*; grind them together on the copper plate, moistening them with *gum water* till they be brought to a proper consistence, neither too thick nor too thin; so you'll have a red inclining to a dark yellow, very fit for use.

There be several more made use of in this, as well as in other painting, but are compounded of the principal colours as we have intimated in our discourse of colours for painting on enamel.

*Another way to paint on GLASS.*

Take very white *glass*, varnish it very thin on one side with a white varnish; then having made choice of some fine impress cut on paper just fit for the piece of glass you design to paint on, dip it in water, and letting it soak and dry a little, clap the picture side thereof to the varnish side of the glass, as exactly plain and even as possible, and so let it dry thoroughly; afterwards moisten the paper on the blank side, and with a blunt graver, draw off and trace the lines of the picture, which will afterwards remain perfectly and distinctly on the varnish side of your glass quarre.

This draught is for the model; you must paint your filings in it, and observe that the tracings and strokes of the picture are to serve you in shadowing, which cannot be repeated without disadvantage to your piece.

The manner of painting on glass is quite contrary to that of limning or painting on cloth or wood; for in this, the paint being but on one side, is plainly visible on the other. Here the settings off are first done; then the compound colours just run over, and so continuing until perfected: whereas on linen, &c. the setting off or heightenings are the last strokes, and their ground colour or first is that which we end withal, and make our last lay in all pieces done on glass.



We do not shew the way to make up the colours, nor how to mix and finish the artificial ones, for that relates immediately to the art of painting, of which you will find in several other articles, and not to this art of glass-painting; and these noted herein are the same as in the other art of painting on cloth, and not very easily prepared.

You must also paint on glass just as in miniature with water colours, laying your picture underneath it as before; and this will shew finer than if done in oyl, besides the colours dry in a moment.

Your pieces being thus done in oyl, or water colours, may receive a very additional and improving beauty by overlaying all the colours, except the ground, with *leaf silver*, which will appear very glorious and lively on such as are transparent, to wit, *lakes, verditers*.

*General remarks for all colours.*

The first time a new pot is put into the furnace, it always leaves some felly or foulness on the glass, which spoils the colours; for this reason they always begin to melt white glass in it first, which afterwards they pour out again into another vessel, to make common glass of it. This the workmen very well know; but the second time, there will appear nothing of this foulness.

Particular care must be taken, that when you prepare materials for tinging glass; the most whereof are extracted from minerals, to do it in a separate furnace, or not have any vessels in it that you use for crystalline materials; for the smoke of metals and minerals, make crystal pale and uneven. The vessels or pots which serve for one colour must not be made use of for another, and every colour ought to have its own pot.

Care must also be taken not to calcine materials more than is necessary, for then they burn and are good for nothing.

As a proportion ought to be kept and minded in every thing we do, so we will here lay down some which must not be exceeded whether for fruit or colours. Notwithstanding when the workman makes any essay, if his colour be not deep enough in his mind, he may add as much as he shall think necessary, which sometimes depends on the preparation of the metals more or less calcined, and often on the fancy of the workman.

It is necessary also to be observed, that all the dose of the colouring ought not to be thrown on the melted glass at once, but at several times, and in proportion according to the quantity of it, stirring each time the materials, that they may both incorporate, and at the same prevent them from rising and running over,

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*How to order the GLASS in the furnace after it has been painted.*

After the glass has been completely painted, and the draughts perfectly finish'd, the difficulty remains in baking the pieces, so as to give it a consistency with the glass, by penetration, which is to be done as follows:

You must work with the furnace here describ'd, and its stove made of good crucible earth, to contain all the work, which must be stratified in the following manner.

Take good quick lime well digested, powdered, and finely searced, and for the better security, let it be digested three times in a potter's furnace, and then powder and searce it; then lay it very even about half an inch thick on the bottom of the stove, and upon that a layer of pieces of broken *Glass*, and upon that another layer of the powder, and so another of glass, then another of powder; the reason of making this stratification of powder and old glass is to prevent any injury from the violence of the fire, which will be very intense under the stove.

This done, upon the third bed or layer of powder, lay a layer of painted glass, and so continue to lay layer upon layer, each lay of powder and glass being evenly made until all the pieces of painted glass are put in or the stove full, and upon the last lay of glass, lay a layer of the powder somewhat thicker than the former.

Then cover the furnace with its shrowds of earth, joining and luting them well together all round with the best lute, so that it may admit of no respiration, but through the fire holes or the opening of the furnace; while you draw out the proofs or trials (by some call'd *watches*) which are bits of broken glass painted with the colours, and put in purely for the purpose of taking out and examining how the work goes on.

Having thus ordered the furnace, and the lute being well dried, begin to heat it gently with some charcoal on the outside of the furnace at the entrance, and so proceed by degrees, and very leisurely heightening it, lest it should break the glass, or spoil the paint.

Continue this for two hours, then thrust the fire in further, and let it remain there for an hour, putting it in by little and little under the stove, where let it stand two hours longer; then increase the fire by degrees for two hours, and so continue to apply fuel till the furnace be full of charcoal, and you perceive the flame to convey it self through every hole of the cover; keep it thus violent for three or four hours, shutting the door of the furnace.

You must be very cautious and careful during the whole work from the first two hours that the fire remains at the entrance.

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From time to time you must draw out some of the pieces of glass that you put into the stove for trials or watches to see if the colours be melted and the yellow be qualified. You may perceive how the work goes on by the sparkling of the iron bars under the stove.

As soon as you find the colours almost done, improve the fire with some very small billets of dry wood; these must be very small that they may be put in the more easily, smoke the less, and to make the flame inviron, reverberate over and round about the stove, which must be continued till the work is finished, which will be in twelve or fourteen hours; then let the fire go out, and the work cool of it self; then it will be finish'd, and take it out, or else it would soon burn the colours and break the glasses.

### COLOURS *for* GLASS.

**BLACK.** Take scales of *iron* one ounce, scales of *copper* one ounce, *jet* half an ounce; reduce them to powder, and mix them.

**BLUE.** Take *powder blue* one pound, *sal nitre* half a pound; mix them, and grind them well together.

**CARNATION.** Take *red chalk* eight ounces, *jet* four ounces, *iron* scales and litharge of *silver* of each two ounces, *gum arabick* half an ounce; dissolve in water; grind all together for half an hour as stiff as you can; then put it in a glass and stir it well, and let it stand to settle fourteen days.

*Another* **CARNATION or RED.** Take *red-chalk* one pound, *jet* one pound and a half; *gum arabick* half a pound; let all be finely powdered; grind them well on a copper plate with rain water very thick, and let it stand three days to settle; then dry it on an earthen dish, and grind it again on a copper plate.

**GREEN.** Take *red-lead* one pound, scales of *copper* one pound, and *flint* five pounds; divide them into three parts, and add to them as much *sal nitre* as one of those parts; put them into a crucible, and melt them with a strong fire, and when it is cold, powder it, and grind it on a porphyry.

*Another.* Take *minium* four ounces, *sand* one ounce, scales of *copper* calcin'd five ounces; mix them together.

**GOLD COLOUR.** Take *silver* an ounce, *antimony* half an ounce; melt them in a crucible; then pound the mass to powder, and grind it on a copper plate; add to it *yellow oker* or *brick dust* calcin'd again fifteen ounces, and grind them well together with water.

*Another.* Take prepared or *leaf-silver*, lay each of them smooth and even on a plate of glass, and burn or anneal the same together, and the glass will be of a delicate golden or yellow colour.

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**Pointure or BLACK.** Take scales of *iron* one part; and *jet* two parts; or scales of *iron* one part, of *jet* one part and a half; or scales of *iron* three parts, *jet* three parts, scales of *copper* two parts, and it will be a pleasant colour.

*Artificial jet for this purpose.* Take *minium* or *red-lead* three parts, *flint* or *white pebbles* one part; mix, calcine, and grind them.

**PURPLE.** Take *minium* one pound, *brown stone* one pound, *white-flint* five pounds; divide them into three parts, and add to them as much *sal nitre* as one of those parts; calcine, melt, and grind it as you do the green.

**RED.** Take *jet* four ounces, litharge of *silver* two ounces, *red-chalk* one ounce; powder them fine and mix them.

*A noble RED or GREEN colour.* Take leaves of *gold* or calx of *gold* made by calcination, or *aqua regis*; put either of them on plates of glass, and heat them gradually red hot together; so will the glass be ting'd of a noble *red* colour, or else of a florid *green*, which colours result from the purity or impurity of the gold.

**WHITE.** Take *jet* two parts, *white flint* ground on a glass very fine one part; mix them. Or, *minium* or *red-lead* three pounds, *sand* from the glass-house one pound; mix them.

**YELLOW.** Take *Spanish brown* ten parts, *leaf-silver* one part, *antimony* half a part; put all into a crucible, and calcine them well.

**GLAUCUS.** A sea deity, represented as *Philostratus* says, with a long white beard and hair, soft and dropping about his shoulders; his eyes green and glittering; his brows full of wrinkles and green spots; his breast all over-grown with greenish sea-weeds or moss, his belly, and from thence downwards, fish-like, full of fins and scales.

*To paint GLOBES, &c. of various colours.*

Put warm *gum-water* into a glass *Globe*, and roll it about in it, so that it be wetted all over, [then pour it out again; then your colours being all ready, with or through a hollow pipe, blow them into the *Globe*.

1. *Vermilion* to represent clouds or wavings.
2. Powder of *blue enamel*.
3. Powder of *copper scales*.
4. *Orpiment* in powder.
5. *Lake* in fine powder.
6. *Water gold* in powder.
7. *Leaf silver* in powder, or any other colours you like better. You may blow them to what parts of the *Globe* you please, by directing the pipe accordingly. Having done this, put a good quantity of plaster in fine powder into the *Globe*, and shake it

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it well all over, before and till the *gum-water* is dry, and so will it stick fast round about; and what remains loose shake it out, and so will the outside of the *Globe* be finely marbled and colour'd.

*To make the gum-water.*

Put two ounces of *gum Arabick* or rather mouth *glue* in a quart of fair *water*, let it digest for two or three days in warm water; then boil it gently till all is melted, and strain it through a flannel while it is hot, and keep it for use.

GLORY is represented in painting by a beautiful woman, the upper part of her body is almost naked, she bears a sphere, whereon are the twelve signs and a little image, holding a palm in one hand, and a garland in the other.

Her nakedness intimates, that she needs no painting; her actions always being expos'd to view; the sphere, that mundane considerations do not so oblige her to heroic actions as the celestial do. The tokens of victory she holds, intimates, that these two are inseparable, the one produces the other.

GLORY OF PRINCES is represented in painting, as a very beautiful lady with a golden circle about her forehead, interwoven with many precious jewels; her golden locks signify the magnanimous thoughts that possess the minds of Princes. She holds a pyramid signifying their glory in causing magnificent fabricks to be erected, signalizing them to posterity.

GLUE a tenacious viscid matter, which serves as a cement to bind or connect divers things together.

There are divers kinds of *Glues* made use of in divers arts, as the common *Glue*; glove *Glue*; parchment *Glue*; but the two last are more properly call'd *size*.

The *common* or *strong Glue* is us'd by various kinds of artificers, joiners, cabinet-makers, &c.

The best is that made in *England* in square pieces of a ruddy brown colour: *Flanders Glue* is accounted the next in goodness to the *English*.

*Glue* is made of the skins of all kinds of beasts, as oxen, cows, calves, sheep, &c. the older the beast is, the better is the *Glue* made of its hide.

Indeed whole skins are but very rarely us'd for this purpose, those being capable of being apply'd to better purpose; but they make use of the shavings parings or scraps of it, sometimes it is made of the feet, sinews, nerves, &c. of beasts. That made of whole skins is the best and that made of sinews is the worst, and hence arises the difference of *Glues*, for as our tanners generally make the *Glue* themselves; they are not sparing of the parings of the skins, which they never sell; whereas in *France* the *Glue* makers being a peculiar kind of manufacturers, and having no parings,

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parings, &c. but what they buy, they make use chiefly of sinews, feet, &c.

### *The method of making GLUE.*

In making *Glue* of parings they first steep them two or three days in water; then washing them well out, they boil them to the consistence of a thick gelly.

Then they pass this gelly while hot through ozier baskets, to separate the impurities from it; and then let it stand some time to purify it further, when all the filth and ordures are settled to the bottom of the vessel, they melt and boil it a second time.

Then they pour it into flat frames or moulds; whence it is taken out pretty hard and solid, and cut into square pieces or cakes. They afterwards dry it in the wind in a sort of coarse net, at last string it, to finish its drying.

The *Glue* made of sinews, feet, &c. is manag'd after the same manner; only with this difference, that they bone and scour the feet, and don't lay them to steep.

The best *Glue* is that which is oldest.

The surest way to try the goodness of *Glue* is to lay a piece to steep three or four days, and if it swell considerably without melting, and when taken out resumes its former dryness, it is excellent.

*Fish GLUE* is a sort of *glue* made of the nervous and mucilaginous parts of a large *fish*, found chiefly in the *Russian* seas.

These parts being boil'd, bear a near resemblance to that viscid matter found in the skins of cod-fish; when it is boil'd to the consistence of a gelly, they spread it on a leaf of paper, and form it into cakes; in which state it is sent to us.

### *A GLUE that will hold against fire or water.*

Mix a handful of *quick-lime* with four ounces of *linseed-oil*; boil them to a good thickness, then spread it on tin plates in the shade, and it will become exceeding hard; but may be easily dissolv'd over a fire, as *Glue*, and will effect the business to admiration.

GLUTTONY is represented in painting, by a woman in a russet gown, with a long crane neck, and a pretty big belly, a hog lying by her.

Her belly denotes gormandizing, as making her belly her God. The rusty or russet gown shews that as rust eats iron, so does the glutton devour his substance, the hog denotes gluttony.

G. M. E, signifies *Giorgio* of *Mantua*, in other pieces of the abovementioned *Primaticcio*.

GOLD is a yellow metal, the heaviest, purest, most ductile and shining, and on those accounts, the most valuable of all metals.

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The weight of *Gold* is to that of silver, as 19 to 10, a cubic inch of pure *Gold* weighs twelve ounces two drams and fifty two grains; and the cubic inch of silver six ounces five drams and twenty eight grains.

The pound weight or twelve ounces *Troy* of *Gold* is divided into twenty four carats.

The value of *Gold* is to that of silver, as 14 to 1, *standard Gold* is worth 44 *l.* 10 *s.* *sterling* the pound weight; *standard silver* is worth 3 *l.* the pound, or 5 *s.* the ounce.

1. The first characteristick or property of *Gold*, is that it is the heaviest of all bodies.

In every mass of matter, heavier than *Mercury*, there must of necessity be some share of *Gold* more or less; there not being in nature any body of intermediate gravity, *i. e.* no body whose gravity is to that of *Gold* more than as 14 to 19.

2. Its *second* character is that of all known bodies, it is the most ductile and malleable; and of all bodies, its parts have the greatest degree of attraction, *i. e.* cohere with the greatest force.

Of this *Gold* beaters and wire drawers supply us with sufficient proofs.

3. The *third* character of *Gold* is its fixedness in the fire, in which it exceeds all other bodies.

4. The *fourth* character is that it is not dissoluble by any menstruum in nature, except *aqua regia* and *Mercury*.

5. The *fifth* character is that it readily and spontaneously, as by some magnetic virtue attracts and absorbs *Mercury*.

The *sixth* character is that it withstands the violence both of lead and antimony, *i. e.* being fus'd in the coppel along with either of those matters, it does not dissipate and fly off with them in fume; but remains fix'd and unchang'd.

All other metals except *Gold* and silver melted with lead, perish with it, and evaporate by fire; and in all other metals except *Gold*, and even silver itself undergo the same fate.

All the known parts of the earth afford this precious metal, though with a deal of difference in point of purity and abundance.

*America* furnishes the most; and particularly the mines of *Peru* and *Chili*, that of *Asia* is esteem'd the finest, particularly that of *Menaricabo* in the *East-Indies*.

The *Spaniards* say, that they sometimes get *Gold* out of their *Peruvian* mines, twenty three carats fine, before it be purified.

And the *Gold* of *Axima* on the coast of *Africa*, is found from twenty two to twenty three carats.

*Glauber* is of opinion, that there is not any *sand* or *stone*, but *Gold* may be procured from it; *limestone* excepted, but that indeed the expence of separating exceeds the profits. *Gold*



## G O L

*Gold* is chiefly found in mines; though there is some also found in the *sand* and *mud* of the rivers and torrents particularly in *Guinea*.

There is a third sort of *Gold* found in the drains of the mountains of *Chili*; which they separate from the earth by washing, whence the places where it is found or separated are call'd *Lavaderos*.

The earth in these places is usually reddish, and very fine; at about six foot deep it is mixt with grains of large dust; and from hence commences the *stratum* or bed of *Gold*.

Between are banks of soft, bluish-stone, mixt with yellow threads, which yet are not *Gold*, but only pyrites or marcasites of *Gold*.

When they have discovered any of this earth, they endeavour to bring rivulets to it (which in those mountains are very frequent) in order by their force to wash and wear off the upper earth, and lay the golden *stratum* bare.

This they forward by digging with spades, &c. as soon as the golden earth is uncovered, they turn off the water, and dig up the soil by force of arm; and loading it on mules, carry it to the *Lavaderos*, i. e. certain basons of water where the earth passing under several repeated lotions, in different waters, the earthy and impure part is all separated and carried off by the stream and the *Gold*, left at the bottom.

This method of getting *Gold* is very gainful; the expences being but very small compar'd to those in the common way by machines, fire and quicksilver.

The richest of these *Lavaderos* is that *de l'estancia del rey*, twelve leagues from the *Conception*, a port of the *South-Sea*.

*Thuringia* and some other places along the *Rhine*, are the only places in *Europe*, where the *Gold* is got in this manner.

The *Gold* of mines is of two kinds, the one in small pieces or grains of various forms and weight.

Of this sort among the specimens sent by *Columbus* into *Spain*, to let them see the richness of his discovery, there were some of eighteen ounces weight, and the relations of those times assert, that in the year 1502, there were others found of thirty two pound weight.

The other kind of *Gold* is dug up in stony glebes, which is what is call'd the mineral or ore of *Gold*.

These glebes are of various colours, and usually a hundred and fifty, or a hundred and sixty fathom deep.

These glebes usually contain some other mineral matter along with the *Gold*, as *antimony*, *vitriol*, *sulphur*, *copper* or *silver*; especially the last, without some share of which it is scarce ever found,

*The*

## G O L

### *The manner of separating Gold.*

The metalline stone is first broken pretty small with an iron mallet; then it is carried to the mills, where it is ground to a very fine powder, and lastly is pass'd through several brass sieves, the last of which is as fine as any of our silk sieves.

The powder being thus prepar'd, is laid on wooden troughs, with a proper quantity of *Mercury* and water; and is there left to knead and saturate in the sun and air for forty eight hours.

After this, the water with the recementitious earth is drove out of the tubs, by means of other hot waters poured thereon.

When this is done, there remains nothing but a mass of *Mercury*, with all the *Gold* that was in the ore.

The *Mercury* is separated from it by distillation in large alembicks.

The *Gold* in this estate is call'd *virgin Gold*, as well as that found in the sand of rivers, or that in grains in the mines, in that none of them have pass'd the fire.

After this, it is usually fus'd in crucibles, and cast into plates or ingots.

*Virgin Gold* is *Gold* just as it is taken out of the mines, before it has undergone any action or preparation by fire.

*Virgin Gold* is said to be very pale, and so soft, that it may be moulded into any figure with the hand; it will even take an impression from a seal like the softest wax. To harden it, as also to heighten its colour, they mix emery with it.

*Fine or pure Gold*, is that purg'd by fire of all its impurities and all alloy.

The moderns frequently call it *Gold* of twenty four carats; but there is not in reality any such thing as *Gold* so very pure; and there is always wanting at least a quarter of a carat. *Gold* of twenty two carats, has one part of *silver* and another of *copper*; that of twenty three carats has half a part, *i. e.* half a twenty fourth of each.

In *England* at this time the standard crown of *Gold*, is twenty two carats fine.

### *To make Gold softer.*

Take *Mercury sublimite*, *sal armoniack*, of each a like quantity, powder them, melt *Gold*, and put to it a little of this powder, and it will be softer.

### *Another way to do the same.*

Take *vitriol*, *verdet*, *sal armoniack*, *burnt brass*, of each one ounce, mix them with *aqua fortis*, let it stand in the heat for two days; and then let it harden, do this three times with *aqua fortis*, and let it dry, then reduce it to a powder, and to one dram put an ounce of *Gold*, three times, and it will be softer,

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*Or thus; quench Gold in water of sal armoniack, and it will be softer.*

*Or thus; take honey and oil of each a like quantity, quench Gold in it three or four times, and it will be softer.*

*To colour and soften GOLD.*

Diffolve *verdegrease* in *vinegar*, and strain it through a felt, then congeal it, and when it begins to grow thick, put some *sal armoniack* to it, and let it harden a good while; then melt the gold with it, and it will heighten the colour, and make it soft.

*To make GOLD and silver softer.*

Take *Mercury sublimate*, *sal armoniack*, of each a like quantity, powder them, melt the *Gold*, and put to it a little of this powder, and it will be soft.

*Another way to do the same.*

Take *vitriol*, *verdet*, *sal armoniack* and *burnt brass*, of each an ounce, mix them with *aqua fortis*, and let it stand in the heat for two days; then let it harden; do thus three times with *aqua fortis*, let it dry, and reduce it to powder. To an ounce of *Gold*, put one dram of it three times, and it will be softer.

*The way of CALCINING GOLD.*

Diffolve an ounce of *Gold* in three ounces of *aqua regalis*; then add to it four ounces of common *Mercury* purified, and pass'd through wash leather, which will precipitate the *Gold* to the bottom of the mattrafs, joining itself to it.

Then the *aqua regalis* will grow clear, which when it is, and seems to have no more *Gold* in it, decant it off, and then wash your matter with warm water to dulcify it, and take away its saltness.

When the matter is dry'd, add to it its weight of flour of *brimstone*; then pound the whole together, put them in a crucible, to which fit another at top, which must be bored at bottom, with a hole big enough to put a quill through, which lute well together and dry them.

Then put them in a round fire, which you must give them by degrees for four hours, the crucible being the last hour wholly covered over with coals, which let kindle and cool again.

Then open the crucible and you will find the *Gold* calcin'd, which *amalgamate* with four ounces of fresh *Mercury*; to which add five ounces more of flour of *brimstone*, pounding them well together as before, then put the whole into crucibles, lute them and give them the same round fire as before; which reiterate a third time, as before, the better to calcine and open the *Gold*; then put it into a glaz'd earthen pan pretty deep, and pour on it good spirit of wine, that may swim two inches above, then put fire to it, and when it is burnt, you will have a very fine *Gold* in an impalpable calx, well opened, which edulcorate with warm water distill'd, and dry it gently.

LIQUID

# G O L

## LIQUID GOLD *and Silver.*

Take five or six leaves of *Gold* or *Silver*, and grind them with a stiff *gum lake water*, and a good quantity of *salt*, as small as you can; then put it into a vial or glaz'd vessel, add to it as much fair *water* as may dissolve the stiff *gum-water*; then let it stand four hours that the *Gold* may settle, decant off this water, and put in more till the *Gold* is clean wash'd; then put more fair water to the *Gold*, a little *sal armoniack* and common *salt*, digesting it close for four days; then put all into a piece of thin glover's leather (whose grain is peel'd off) and hang it up, so will the *sal armoniack* fret away, and the *Gold* remain behind, which keep.

*Or thus*; grind leaf *Gold* with strong or thick *gum-water*, very fine, and while you are grinding it, add more thick *gum-water*, being very fine wash it in a great shell, as you do *bice*, then temper it with a little *Mercury sublimate*, and a little dissolv'd *gum* to bind it to the shell; shake it, and spread the *Gold* about the sides thereof, that it may be all of one colour and fineness, which use with fair water, as you do other colours.

### *To burnish Gold.*

Do the same as to liquid SILVER. Take *gum-lake* and dissolve it into a stiff water, then grind a blade or two of *saffron* with it, and you will have a fair *Gold*; when you have laid it and it is thoroughly dry, burnish it with a dog's tooth.

*Or thus*; Having written what you had a mind with your pen and pencil; cut the leaf *Gold* or *Silver* into pieces, according to the size, take it up with a feather, or cotton, &c. and lay it upon the writing or drawing, which press down with a piece of wool, and being dry burnish it.

### *To make a very fine polish'd GOLD.*

The woods you would gild must be very smooth; and to render them the smoother, it will be proper to pass sea dog's skin over them.

Then *size* it over with a stuff or *size* made of the cuttings of white leather gloves, (See SIZE) and when it is thoroughly dry, lay on nine or ten layers of *white*.

When this is perfectly dry use your shave grasse, that you may render it so much the kinder, and then having made some *size* and water warm, dip a linen rag into it, which wring out, and then rub the *white*.

Then lay on two or three layers of *Gold* colour, and more if it be not of a good body or deep enough; and when it is dry rub it well with a dry cloth, till it is bright again, then take of the strongest brandy you can get, and with a pencil brush wash the *Gold* colour with this brandy; and having leaf *Gold* ready cut, lying upon the cushion, clap it on the moment the pencil

## G O L

is gone over the part ; and when it is dry polish it with a dog's tooth.

### *How to lay on GOLD and SILVER.*

Set your piece flanting, and wet a part with a large pencil dipp'd in fair water, then having the *Gold* ready cut on the cushion, lay on the *Gold*, taking it up with a cotton.

When the whole is gilded, set it by to dry ; but not either in the wind or sun, and when it is dry enough, burnish it with a dog's tooth.

To know when it is in a fit temper, pass the dog's tooth over it in some little places ; and if it does not rub kindly, but peels off, it is not dry enough.

But on the other hand take care not to let it be too dry ; for it will require so much the more trouble in polishing, and after you have done all you can, it will not have the lustre you desire.

### *To lay Gold on any thing.*

Temper *red-lead* ground fine with *linseed-oil*, write with it, and lay leaf *Gold* upon it, let it dry and polish it.

### *To lay Gold on glass.*

Grind together *chalk* and *red-lead* each a like quantity, and temper them with *linseed-oil* ; lay it on and when it is almost dry, lay leaf *Gold* on it, let it be thoroughly dry and then polish it.

### *To MATT GOLD.*

Make a red with *red-lead*, a little *vermilion* and the white of an *egg*, well beaten up ; grind the whole upon a marble, and clap it into the deep or hollow places with a pencil.

### *To make SHELL GOLD and SHELL SILVER.*

Grind leaf *Gold* with honey just out of the hive, or very pure on a clean marble, till it is extremely soft under your hand ; then put it into a glass of fair water, and stir it, changing the water till it is very clear and fine.

Then pour it into the quantity of a penny-worth of *aqua fortis*, and let it lie for two days, then take out the *Gold*, and the *aqua fortis* may serve another time, the same may be done with *Silver*.

When you would lay on either the one or the other, temper it with one or two drops of a very thin *gum water*, and to give it the smoother face, let your water be soap'd.

It will be also proper to have a wash of *gall-stone* under the *Gold*, which sets it much off.

### *To dye SILK a GOLD colour.*

This must be dyed after the same manner as the straw colour is, only when it is become reasonably deep, put it into the last suds of the orange-liquor and stir it therein so long, till you are sure it is grown deep enough, then rinse it out and dry it.

*To*

*To dye stuff a GOLD colour.*

Let the stuff be first dyed yellow, then set fresh water over the fire, and for every pound of ware, use an ounce of *fustel-wood*, call'd also *yellow shavings*, and a good quantity of coarse *pot-ashes*; let the dye boil for half an hour, and afterwards work the stuff in it.

For a GOLDEN figure in painting, lay on *shell Gold*, and shade with *Gall-stone*.

**HG** HENRY GOLTZIUS, This celebrated *Dutch* engraver imitated the manner of several masters, who liv'd before him. He engrav'd the paintings of *Raphael* and other masters, he us'd this mark.

G. P. signifies *George Pens*.

GRACE OF GOD is represented in painting, by a pretty agreeable damsel all naked, with a very becoming head dress; her golden locks plaited, and surrounded with splendor; holding in both hands a *cornucopia*, she pours from it many things useful, and a shining ray round even to the ground.

Her nakedness denotes her innocence, that needs no external ornaments, the benefits and good things she disperses shew, that they all proceed from heaven.

GRACE and GREATNESS. There is some degree of merit in a picture where nature is exactly copied, though in a low subject; such as drolls, country-wakes, flowers, landscapes, &c. and more in proportion as the subject rises, or the end of the picture is this exact representation. Herein the *Dutch* and *Flemish* masters have been equal to the *Italians*, if not superior to them in general. What gives the *Italians* and their masters the preference, is, that they have not servilely follow'd common nature, but rais'd and improv'd, or at least have always made the best choice of it.

This gives a dignity to a low subject, and is the reason of the esteem we have for the landscapes of *Salvator Rosa*, *Filippo Laura*, *Claude Lorrain*, the *Poussins*; the fruit of the two *Michael Angelo's*, the *battaglia* and *compadoglio*; and this, when the subject itself is noble, is the perfection of painting: as in the best portraits of *Vandyck*, *Rubens*, *Titian*, *Rafaelle*, &c. and the histories of the best *Italian* masters; chiefly those of *Rafaelle*; he is the great model of perfections! All the painters being rank'd in three several classes according to the degrees of their merit, he must be allow'd to possess the first alone.

Common nature is no more fit for a picture, than plain narration is for a poem: a painter must raise his ideas beyond what he sees, and form a model of perfection in his own mind, which is not to be found in reality; but yet such a one as is probable, and rational. Particularly with respect to mankind, he must as it were raise the whole species, and give them all imaginable

beauty and grace, dignity and perfection; every several character, whether it be good, or bad, amiable, or detestable, must be stronger and more perfect.

At court, and elsewhere amongst people of fashion, one sees another sort of beings than in the country, or the remote and inferior parts of the town; and amongst these there are some few that plainly distinguish themselves by their noble and graceful airs, and manner of acting. There is an easy gradation in all nature; the most stupid of animals are little more than vegetables, the most sagacious and cunning are hardly inferior to the lowest order of men, as the wisest and most virtuous of these are little below the angels. One may conceive an order superior to what can any where be found on our globe; a kind of new world may be form'd in the imagination, consisting, as this, of people of all degrees and characters; only heightned, and improv'd; a beautiful gentlewoman must have her defects overlook'd, and what is wanting to complete her character supply'd: a brave man, and one honestly and wisely pursuing his own interest, in conjunction with that of his country, must be imagin'd more brave, more wise, more exactly and inflexibly honest than any we know, or can hope to see; a villain must be conceiv'd to have something more diabolical than is to be found even amongst us; a gentleman must be more so, and a peasant have more of the gentleman, and so of the rest. With such as these an artist must people his pictures.

Thus the ancients have done, notwithstanding the great and exalted ideas we may have of the people of those times, from their histories, (which probably are improv'd by the historians using the same management in their writings as I have recommended to the painters; it was the poet's proper business so to do) one can hardly believe them to be altogether such as we see in the antique statues, bas-reliefs, medals, and intaglia's. And thus the best modern painters and sculptors have done. *Michael Angelo* no where saw such living figures as he cut in stone.

When a man enters into that awful gallery at *Hampton-Court*, he finds himself amongst a sort of people superior to what he has ever seen, and very probably to what those really were. Indeed this is the principal excellence of those wonderful pictures, as it must be allow'd to be that part of painting which is preferable to all others.

What a grace and majesty is seen in the great Apostle of the *Gentiles*, in all his actions, preaching, rending his garments, denouncing vengeance upon the forcerer! What a dignity is in the other Apostles wherever they appear, particularly the Prince of them in the cartoon of the death of *Ananias*! How infinitely and divinely great and gentile is the Christ in the boat!



## G R A

But these are exalted characters which have a delicacy in them as much beyond what any of the gods, demi-gods, or hero's of the ancient Heathens can admit of, as the Christian Religion excels the ancient superstition. The proconsul *Sergius Paulus* has a greatness and grace superior to his character, and equal to what one can suppose *Cæsar*, *Augustus*, *Trajan*, or the greatest amongst the *Romans* to have had. The common people are like gentlemen; even the fishermen, the beggars, have something in them much above what we see in those orders of men.

And the scenes are answerable to the actors; not even the beautiful gate of the temple, nor any part of the first temple, nor probably any building in the world had that beauty and magnificence as appears in what we see in the cartoon of healing the cripple. *Athens* and *Lystra* appear in these cartoons to be beyond what we can suppose they were, when *Greece* was in its utmost glory; even the place where the Apostles were assembled (in the cartoon of *Ananias*) is no common room; and tho' the steps and rails which were made on purpose for them for the exercise of their new function, have something expressive of the poverty and simplicity of the infant church, the curtain behind, which also is part of the Apostolical equipage, gives a dignity even to that.

'Tis true, there are some characters which are not to be improv'd, as there are others impossible to be perfectly conceiv'd, much less express'd. The idea of God no created being can comprehend, the divine mind only can, and 'tis the brightest there; and infinitely bright! And would be judg'd to be so even by us, tho' the difficulties arising from the consideration of the moral and natural evil, which is in the world, were not to be solv'd by the common expedients. I will only venture to say with respect to the latter, that this is so far from being an objection to the infinite goodness of God, that God could not have been infinitely good, if he had not produc'd an order of beings, in which there was such a mixture of natural evils as to be just preponderated by the enjoyments, so as upon the foot of account to render being eligible; for without this, one instance of goodness had been omitted.

No statue, or picture, no words can reach this character; the *Colossian* statue of *Phidias*, the pictures of *Rafaëlle*, are but faint shadows of this infinite and incomprehensible Being. THE THUNDERER, the BEST, AND GREATEST: The FATHER OF GODS AND MEN, of *Homer*; the ELOHIM, the JEHOVAH, the I AM THAT I AM, of *Moses*; the LORD of HOSTS, of the prophets: Nay, the GOD AND FATHER OF OUR LORD JESUS CHRIST, the ALPHA and OMEGA, the ALL IN ALL of the New Testa-

ment: These give us not an adequate idea of him, though that comes nearest where not terror, and fury, but majesty, power, wisdom, and goodness, is best express'd. A God incarnate, and Saviour of mankind by obedience and suffering; a crucified God risen from the dead: these are characters that have something so sublime in them, that we must be contented to own our beloved *Rafaëlle* has fail'd here, more especially in some instances; I don't mean that in the cartoon of giving the keys, for that I verily believe has receiv'd some injury, and is not now like what *Rafaëlle* made it. That incomparable hand that painted the history of *Cupid* and *Psyche*, in the palace of *Chigi* at *Rome*, has carried the fictitious deities of the Heathens as high as possible, but not beyond what should be conceiv'd of them; as *Michael Angelo Buonaroti* (particularly in two or three drawings) has made Devils not such as low genius's represent them, but like those of *Milton*; but the proper idea of a Devil has such an excess of evil in it as cannot be exaggerated; in all such cases 'tis sufficient if all be done that can be done; the painter must shew what he aims at, he must give him that sees the picture all the assistance he can, and then leave him to supply the rest in his own imagination.

There are other characters, which tho' inferior to these, are so noble, that he must be a happy man who can conceive them justly, but more so if he can express them: Such are those of *Moses*, *Homer*, *Zenophon*, *Alcibiades*, *Scipio*, *Cicero*, *Rafaëlle*, &c. If we see these pretended to be given in picture, we expect in them all that greatness and grace I have been recommending; all is necessary here in order to satisfy us that the history is truly related; as the pleasure we take in having our minds fill'd with fine and extraordinary ideas is a sufficient reason for raising all the more inferior characters. Life would be an insipid thing indeed if we never saw, or had ideas of any thing but what we commonly see; a company of awkward silly-looking people, doing what is of no consequence but to themselves in their affairs; and to see such in picture can give no great pleasure to any that have a true and refin'd taste.

A history painter must describe all the various characters, real or imaginary; and that in all their situations, pleas'd, griev'd, angry, hoping, fearing, &c. a face painter has to do with all the real characters, except only some few of the meanest, and the most sublime, but not with that variety of sentiments as the other. The whole business of his life is to describe the *golden age*, when every one of his people must therefore appear pleas'd, and in good humour, but varied suitably to the rais'd character of the person drawn; whether this tranquillity and delight be suppos'd to arise from the sight of a friend, a reflection upon a  
scheme

scheme well laid, a battle gain'd, successes in love, a consciousness of ones own worth, beauty, wit, agreeable news, truth discover'd, or from whatever other cause. If a Devil were to have his portrait made, he must be drawn as *abstracted from his own evil, and stupidly good*, (to use *Milton's* words).

If some grave characters require an air of thoughtfulness, as if engag'd in a diligent search after truth, or in some important project, they must however not appear displeas'd, unless in some rare instances, as *Van-Dyck* has put something of sorrow in one picture of his unfortunate patron King *Charles I.* (I mean that at *Hampton-Court*) which I believe was done when he was entering into his troubles, and which is therefore in that respect historical. In general; the painting room must be like *Eden* before the fall, like *Arcadia*, the joyless, turbulent passions must not enter there.

Thus to raise the character, to divest an unbred person of his rusticity, and give him something at least of a gentleman; to make one of a moderate share of good sense appear to have a competency, a wise man to be more wise, and a brave man to be more so, a modest, discreet woman to have an air something angelical, and so of the rest; and then to add that joy, or peace of mind at least, and in such a manner as is suitable to the several characters, is absolutely necessary to a good face painter: but 'tis the most difficult part of his art, and the last attain'd; perhaps 'tis never so much as thought of by some, all that they aim at is to make such a likeness of the face as shall be known immediately; and that it be young, fair, and handsome; and frequently those for whom the pictures are made expect no more; whether the characters of wisdom or folly be impress'd upon them it matters not. Accordingly, we see portraits which are perfect burlesques upon the minds of the persons drawn; a wise man shall appear with the air of a fop; a man of spirit and wit, like a smart, or a pretty fellow; a modest ingenious man like a beau, a virtuous lady as a meer coquet.

The late Duke of *Buckingham (Villers)* when he heard a lady commended for her goodness, swore she was ugly; because beauty being a woman's top-character, he concluded that would have been insisted on if there was any ground for it. A painter should observe, and pronounce strongly the brightest part of the character of him he draws. To give an air of youth, and gaiety to the portrait of one who is entitled to nothing higher, is well enough; but to overlook a noble and sublime character, and substitute this in the place of it, is detestable. The only supposing a man capable of being pleas'd with such a piece of false flattery, is a lampoon upon his understanding.

Nor is the beauty of the face and person, whether as to the age, features, shape, or colour to be unregarded, or (where it can be done) unimprov'd; indeed something of this will naturally fall in when the mind is express'd, which cannot be done to advantage without giving some to the body.

But the face painter is under a greater constraint in both respects than he that paints history; the additional grace and greatness he is to give, above what is to be found in the life, must not be thrown in too profusely, the resemblance must be preserv'd, and appear with vigour; the picture must have both. Then it may be said, that the gentleman, or lady, makes a fine picture: but the likeness not being regarded, 'tis not they, but the painter that makes it; nor is there any great difficulty in making such fine pictures.

I was lately observing with a great deal of pleasure how the ancients had succeeded in the three several ways of managing portraits: I happen'd to have them before me (amongst others) several medals of the Emperor *Maximinus*, who was particularly remarkable for a long chin; one medal of him had that, but that the artist might be sure of a likeness he had exaggerated it; another had a mind to flatter, and he had par'd off about half of it; but these as they wanted the just resemblance, so there was a poverty in them, they were destitute of that life and spirit which the other had, where nature seems to have been more closely follow'd. In making of portraits we must keep nature in view, if we launch out into the deep we are lost.

What it is that gives the grace and greatness I am treating of, whether in history or portraits, is hard to say. The following rules may however be of some use on this occasion.

*The airs of the heads must especially be regarded.* This is commonly the first thing taken notice of when one comes into company, or into any publick assembly, or at the first sight of any particular person; and this first strikes the eye, and affects the mind when we see a picture, a drawing, &c.

*The same regard must be had to every action, and motion.* The figures must not only do what is proper, and in the most commodious manner, but as people of the best sense and breeding, (their character being consider'd) would, or should perform such actions. The painter's people must be good actors; they must have learn'd to use a human body well; they must sit, walk, lie, salute, do every thing with a grace. There must be no awkward, sheepish, or affected behaviour, no strutting, or silly pretence to greatness; no bombast in action; nor must there be any ridiculous contorsion of the body, nor even such appearances, or fore-shortnings as are displeasing to the eye, though the same attitude in another view might be perfectly good.

Not

## G R A

Not that 'tis possible that every part of a picture, or even of a single figure can be equally well dispos'd, something may not be as one would wish it; yet in the main it may be better than if it were otherwise. More may be lost than gain'd by the alteration; 'tis here as 'tis in life, we are frequently uneasy under certain circumstances, but those being remov'd, we wish ourselves as we were before; the present grievance strikes strongly on our minds, we either don't see, or are not so livelily affected with the consequences of a change.

*The contours must be large, square, and boldly pronounc'd to produce greatness, and delicate and finely wav'd and contrasted to be gracious.* There is a beauty in a line, in the shape of a finger, or toe, even in that of a reed, or leaf, or the most inconsiderable things in nature. Some of the drawings of *Giulio Romano* are instances of this kind; his insects and vegetables are natural, but as much above those of other painters as his men are: there is that in these things which common eyes see not, but which the great masters know how to give, and they only.

But this is not all; nature with all its beauties has its poverities, superfluities and defects, which are to be avoided and supply'd, but with great care and judgment; that instead of exceeding nature, it be not injur'd. There is (for example) great beauty in a certain squareness in pronouncing a feature, or any part of a figure, this some have carried to an excess, and have thereby discover'd they knew something, but not enough; which is the case in many other instances. What is here said of drawing, is also applicable to colouring.

The draperies must have broad masses of light and shadow, and noble large folds to give a greatness; and these artfully subdivided, add grace. As in that admirable figure of *St. Paul* preaching, which has been already spoken of, the drapery would have had a greatness if that whole broad light had been kept, and that part which is flung over his shoulder, and hangs down his back, had been omitted; but that adds also a grace. Not only the large folds and masses must be observ'd, but the shapes of them, or they may be great, but not beautiful.

*The linen must be clean and fine; the silks and stuffs new, and the best of the kind.*

*Lace, embroidery, gold and jewels must be sparingly employ'd.* Nor are flower'd silks so much us'd by the best masters as plain, nor these so much as stuffs or fine cloth; and that not to save themselves trouble, of which at the same time they have been profuse enough. In the cartoons, *Rafaele* has sometimes made silks, and some of his draperies are scollop'd, some a little strip'd, some edg'd with a kind of gold lace, but generally they are plain. Tho' he seems to have taken more pains than he needed  
in

in the landscapes, as he has also those badges of spiritual dignity on the heads of Christ and the Apostles. But these, as all other ensigns of grandeur and distinction, as they have been wisely invented to procure respect, awe and veneration, give a greatness as well as beauty to a picture.

*'Tis of importance to a painter to consider well the manner of clothing his people.* Mankind have shewn an infinite variety of fancy in this, and for the most part have disguis'd rather than adorn'd human bodies. But the truest taste in this matter the antient *Greeks* and *Romans* seem to have had; at least the great idea we have of those brave people, prejudices us in favour of whatever is theirs, so that it shall appear to us to be graceful and noble. Upon either of which accounts, whether of a real or imagin'd excellence, that *manner* of cloathing is to be chosen by a painter when the nature of his subject will admit of it. Possibly improvements may be made, and should be endeavour'd, provided one keeps his antique taste in view, so as to preserve the benefit of prejudice just now spoken of. And this very thing *Rafaëlle* has done with great success, particularly in the cartoons. Those that, in representing antient stories, have follow'd the habits of their own times, or gone off from the antique, have suffer'd by it; as *Andrea del Sarto* (who first led the way) and most of those of the *Venetian* school have done.

But howsoever a figure is clad, this general rule is to be observed, *That neither the naked must be lost in the drapery, nor too conspicuous*, as in many of the statues and *bas reliefs* of the antients; and which (by the way) they were forc'd to, because to have done otherwise, would not have had a good effect in stone.

The naked, in a cloathed figure, is as the anatomy in a naked figure; it should be shewn, but not with affectation.

*Portrait painters* seeing the disadvantage they were under in following the dress commonly worn, have invented one peculiar to pictures in their own way, which is a composition partly that, and partly something purely arbitrary.

Such is the ordinary habit of the ladies, that how becoming soever they may be fancied to be, as being worn by them, or what we are accusom'd to, or upon whatever other account, 'tis agreed on all hands, that in a picture they have but an ill air; and accordingly are rejected for what the painters have introduc'd in lieu of it, which is indeed handsome, and perhaps may be improv'd.

In the gentlemens pictures the case is very different; 'tis not so easy to determine as to their drapery.

What is to be said for the common dress is, *That*  
It gives a greater resemblance; and  
Is historical as to that article.



## G R A

The arguments for the other are, That

They suit better with the ladies pictures, which (as has been observ'd) are universally thus dress'd :

They are not so affected with the change of the fashion as the common dress; and

Are handsomer, that is, have more grace and greatness.

Let us see how the case will stand, this latter consideration of handsomeness being for the present set aside.

The first argument in favour of the arbitrary loose dress seems to have no great weight; nor is there so much as is commonly thought in the second; because in those pictures which have that kind of drapery, so much the dress of the time, is always, and must be retain'd, and that in the most obvious and material parts, that they are influenced by the change of fashion in a manner as much as those in the habits commonly worn. For proof of this, I refer you to what was done when the great wiggs and spreading huge neck-cloths were in fashion. So that here does not seem to be weight enough to balance against what is on the other side, even when the greatest improvement as to the colour, or materials of the common dress is made, for still there will be a sufficient advantage upon account of resemblance and history to keep down the scale.

Let us now take in the argument of grace and greatness, and see what effect that will have.

The way to determine now is to fix upon the manner of following the common dress, whether it shall be with or without improvement, and in what proportion: This being done, let that you have fix'd on be compar'd with the arbitrary, loose dress in competition with it, and see if the latter has so much the advantage in grace and greatness, as to over-balance what the other had when these were not taken in: If it has, this is to be chosen; if not, the common dress.

Thus I have put the matter into the best method I was able in order to assist those concern'd to determine for themselves, which they can best do, fancy having so great a part in the affair. And so much for this controversy.

*There is an artificial grace and greatness arising from the opposition of their contraries.* As in the tent of *Darius* by *le Brun*, the wife and the daughters of that prince owe something of their beauty and majesty to the hideous figures that are about them. But a greater man than *le Brun* seems to have condescended to be beholden to this artifice in the banquet of the Gods at the marriage of *Cupid* and *Psyche*; for *Venus*, who comes in dancing, is surrounded with toils, as the *Hercules*, the face of his lion's skin, *Vulcan*, *Pan*, and the mask in the hand of the muse next to her. Some subjects carry this advantage along with them,



them, as the story of *Andromeda* and the monster; *Galatea* with the *Tritons*; and in all such where the two contraries, the masculine and feminine beauties are oppos'd (as the figures of *Hercules* and *Dejanira* for instance.) These mutually raise and strengthen each other's characters. The Holy Family is also a very advantageous subject for the same reason. I need not enlarge here; the artifice is well known, and of great extent; 'tis practis'd by poets, historians, divines, &c. as well as painters.

What I have hitherto said will be of little use to him who does not fill and supply his mind with noble images. A painter should therefore read the best books, such as *Homer*, *Milton*, *Virgil*, *Spencer*, *Thucydides*, *Livy*, *Plutarch*, &c. but chiefly the Holy Scripture, where is to be found an inexhaustible spring, and the greatest variety of the most sublime thoughts, express'd in the noblest manner in the world. He should also frequent the brightest company, and avoid the rest. *Rafaëlle* was perpetually conversant with the finest genius's, and the greatest men at *Rome*; and such as these were his intimate friends. *Giulio Romano*, *Titian*, *Rubens*, *Van Dyck*, &c. to name no more, knew well how to set a value upon themselves in this particular. But the works of the best master in painting and sculpture should be as a painter's daily bread, and will afford him delicious nourishment.

If I had been shewn a picture of *Rafaëlle's* (said *Carlo Maratti* to his friend) and not having ever heard of him, had been told 'twas the work of an angel, I should have believed it. The same friend of *Carlo Maratti* said he had seen an entire book consisting of about two or three hundred drawings of heads which the same *Carlo* had made after that of the *Antinoüs*, and which he said he had selected out of about ten times the number he had drawn after that one head; but confess'd he had never been able to reach what he saw in his model. Such was the excellency of the sculptor! and such the diligence, perseverance and modesty of *Carlo*!

The antients possess'd both the excellent qualities I have been treating of, among whom *Apelles* is distinguish'd for grace. *Rafaëlle* was the modern *Apelles*, however not without a prodigious degree of greatness: His style is not perfectly antique, but seems to be the effect of a fine genius, accomplish'd by study in that excellent school: 'Tis not antique, but (may I dare to say it?) 'tis better, and that by choice and judgment. *Giulio Romano* had grace and greatness, more upon the antique taste, but not without a great mixture of what is peculiarly his own, and admirably good, but never to be imitated. *Polydore* in his best things was altogether antique. The old *Florentine* school had a kind of greatness that like *Hercules* in his cradle promis'd wonders

ders to come, and which was accomplished in a great measure by *Leonardo da Vinci* (who also had grace) but more fully and perfectly by *Michael Angelo Buonarota*: His style is his own, not antique, but he had a sort of greatness in the utmost degree, which sometimes ran into the extreme of terrible, though in many instances he has a fine seasoning of grace. When *Parmeggiano* copy'd him, and flung in his own sweetness, they together make a fine composition: I don't say however that they are preferable to what is entirely of *Michael Angelo*, or even to what is entirely of *Parmeggiano*, especially his best; but they are as if they were of another hand, of a character between both: For *Parmeggiano* was infinitely sweet! Grace shines in all he touch'd, and a greatness supports it, so as one would not wish him other than he is; his style is entirely his own, not in the least modern, nor very much upon the antique: what he did seems to flow from nature, and are the ideas of one in the golden age, or state of innocence. *Baccio Bandinelli* had a great style, and sometimes not without grace. *Correggio* had grace not inferior to *Parmeggiano*, and rather more greatness; but different in both from him, and from the antique: What he had was also his own, and was chiefly employ'd on religious subjects, or what had nothing terrible in them. *Titian*, *Tintoret*, *Paolo Veronese*, and others of the *Venetian* school have greatness and grace, but 'tis not antique, however 'tis *Italian*. *Annibale Carracci* was rather great than gentile, tho' he was that too; and *Guido's* character is grace. *Rubens* was great, but rais'd upon a *Flemish* idea. *Nicholas Poussin* was truly great and graceful, and justly stiled the *French Rafaele*. *Salvator Rosa's* landscapes are great, as those of *Claude Lorrain* are delicate: Such is the style of *Filippo Laura*; that of the *Borgognone* is great. To conclude, *Van Dyck* had something of both these good qualities, but not much, nor always; he generally kept to nature, chosen in its best moments, and something rais'd and improv'd; for which reason he is in that particular, and when he fell not lower, the best model for portrait-painting, unless we prefer a *chimera* of the painter, to a true, or at most a civil representation of our selves or friends; and would have a cheat put upon posterity, and our own or friends resemblance lost and forgotten for the sake of it.

The notions of mankind vary in relation to beauty, and in some particulars with respect to magnanimity: It may be worth a painter's while to observe what were those the antients had in these matters, and then to consider whether they agree with the present taste; and if they do not, whether they or we are in the right, if it can be determined by reason. If it depends upon fancy only, then let him consider whether the prejudices we  
are

are apt to have for the antients, will balance against the opinion of the present age. As to the draperies, the antients must be studied with caution, as has been already observ'd.

Instead of making *caricatures* of peoples faces (a foolish custom of burlesquing them, too much used) painters should take a face, and make an antique medal, or *bas-relief* of it, by divesting it of its modern disguises, raising the air and the features, and giving it the dress of those times, and suitable to the character intended. Our nation is allow'd on all hands to furnish as proper models as any other in the world, with respect to external grace and beauty: Nor perhaps can antient *Greece* or *Rome* boast of brighter characters than we.

Lastly, a painter's own mind should have grace and greatness, that should be beautifully and nobly form'd.

GRACEFUL POSTURE and *proper actions* is the second thing in a good picture, that is, that the true and natural motion of every thing be express'd in the life and spirit of it, that is to quicken the life by art; as in a *king* to express the greatest majesty, by putting or designing him in such a graceful posture, that may move spectators with reverence in beholding him.

And to draw a *soldier* in such a posture, as may betoken the greatest courage, boldness and valour; and to represent a *clown* in the most awkward and clownish posture; a *servant* or *page* in the most attentive and diligent posture, &c.

And so in all your draughts, the inward affections and dispositions of the mind may be most lively express'd in the outward action and gesture of the body.

Now to attain the knowledge of this, you ought most diligently to observe the works of several famous masters, and also to follow their examples, who were us'd to delight themselves in beholding private persons; as the actions, postures, and gestures of wrestlers, sword-fighters, boxers at handy-cuffs, stage-players, the alluring glances and gestures of curtezans, and in malefactors going to execution to observe the contracting of their brows, the motions of their eyes, and the motions of their whole bodies, to the end that they might express them to the life in their drawings and works.

Take care likewise that you draw with a certain *looseness* which is a great excellency in drawing, that is, that the body be not made stiff in any part; but that every joint may have its proper bendings, so that it may with the greater life express the intention, that the figure may not seem lame and the joints stiff, as if they were not pliable or capable of bending; but that every joint and limb may have its proper freeness and looseness, according as it may best suit with and become the posture in which the figure is set.

GRANATE,

## G R A

**GRANATE**, a gem or precious stone, of a high red colour; thus call'd from the resemblance it bears to that of the seed or kernel of a pomegranate.

*Granates* are either *oriental* or *occidental*; the *oriental* are brought from divers parts of the *East-Indies*; the *occidental* from *Spain*, *Bohemia*, and *Silesia*.

The *oriental* are distinguished by their colour into three kinds. The first is of a deep brownish red, like black clotted blood; of which kind there are some as big as an hen's egg: the *second* are very nearly of the colour of an *hyacinth*, with which it were easy to confound them, but for their superior redness: the *third* sort has a mixture of violet with their red, and is call'd by the *Italians*, *rubina della rocha*.

The *occidental Granates* are of a red colour, but of different degrees, according to the country they come from. Those of *Spain* imitate the colour of the kernel of a pomegranate: those of *Bohemia* have a golden cast with their red, glittering like a live coal: those of *Silesia* are the darkest of all, and are seldom thoroughly transparent.

The *Granates* of *Bohemia* are the most valued of the *occidental* ones, and some prefer them even to the *oriental* ones. They are found near *Prague*, not in any particular mines, but are pick'd up by the peasants in the fields from among the sands and pebbles.

*To make a GRANATE colour in glass.*

The beauty of this colour is to express the yellowish red of fire, when it is expos'd to the sun.

Take crystal *frit*, and of *frit* of *Rochetta* each an equal quantity, mix them well, and to fifty pounds of these materials add half a pound of *manganese* of *Piedmont* prepar'd, half an ounce of *zaffer* prepar'd; mix them well with the *frits*; then put them by little and little into an earthen pot made red hot in the furnace, because the glass is apt to rise and run over.

After four days, the glass being well ting'd and purified, you may work it; you may increase or diminish the colour as much as you please, which depends on the discretion of the operator, who puts in the powders which ought to be put in orderly, that the matter be not spoiled.

*To make a GRANATE colour in glass of lead.*

The vivacity of this colour appears no less in glass of lead than in crystal, if it be carefully made.

Take ten pounds of crystal *frit*, and eight pounds of calx of *lead*, and after having added an ounce and a half of *manganese* of *Piedmont*, and a quarter of an ounce of *zaffer* both prepar'd (as is taught under the articles **MANGANESE** and **ZAFFER**) put the whole into a pot, heated in the furnace; twelve hours  
after

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after cast that melted matter into water, and take out the lead that remains behind in the pot.

Then put the matter again into the same pot, and let it stand ten hours to purify.

Then mix it well with the iron, and let the *fæces* precipitate; then see if the colour pleases you; then work it to what uses you please, and you'll have a glass of lead of a fine *Granate* colour.

*To make a paste for an oriental GRANATE.*

The *Granate* is very like the *carbuncle*, for being both expos'd to the sun, they exhibit the colour of live burning coals, being between red and yellow, which is the true colour of fire.

There are several sorts of *Granates*, both *oriental* and *occidental*, some deeper, others paler; but the jewellers know how to make them appear, by setting them on silver foils.

The way to imitate them is as follows:

Take two ounces of natural *crystal* prepar'd, and six ounces of *minium*, with sixteen grains of *manganese* of *Piedmont*, and two grains of *zaffer* prepar'd; let the whole be pulveriz'd and well mixt together, and being put into a crucible, set them into the furnace with its cover well luted; there let them bake with the same precautions given as to the pastes for other gems, and you will have a very fine *Granate* as resplendent as the *oriental*.

*A deeper oriental GRANATE.*

This colour will not only be deeper, but also far fairer than the precedent.

To make it, take two ounces of *natural crystal* prepar'd, five ounces and a half of *minium*, to which add fifteen grains of *manganese* of *Piedmont* prepar'd; and having pulveriz'd it, mix the whole together, and proceed in baking this paste as directed for other pastes, only take notice, you must here leave more empty space in the crucible, because this matter rises more than the others, wherein care must be taken. Then will you have a deeper oriental *Granate* than the former, which you may polish, &c.

*Another fairer GRANATE.*

This paste will be yet much fairer than the precedent, if you take to two ounces of *natural crystal* calcin'd and prepar'd, six ounces of *vermilion* or *minium* in fine powder, thirty-five grains of *manganese* of *Piedmont* prepar'd, and four grains of prepar'd *zaffer*, which being well pulveriz'd, mix together in a crucible, leaving a greater empty space than in the other, by reason the matter rises more than in the others; then lute the cover well, let it dry, and put it in the furnace to bake, as is directed as to other artificial gems, observing the same circumstances noted on that

that subject, and you will have a very fine *Granate*, fairer than the rest.

GRAND GUSTO, a term us'd by painters, to express, that there is something in the picture very great and extraordinary, calculated to surprize, please, and instruct.

Where this is found, they say the painter was a man of the *Grand Gusto*; and they use the word *sublime* and *marvellous*, when they speak of a picture much in the same sense.

*G* JAMES GRAND HOMME engrav'd the portraits of the *Heresiarchs* and others, after *Rembrant's* manner; us'd this mark. At other times he mark'd thus: *J. C. van Uliet.*

GRANITE, a sort of marble extremely hard, rough and incapable of taking a thorough polish; thus call'd, because sprinkled over as it were with a great number of little stains, resembling great grains of sand.

There are three sorts of *Granites*; that of *Egypt*, that of *Italy*, and that of *Dauphiny*.

That of *Egypt* has brownish or greenish spots on a dirty white ground. It is found in very large pieces, and is that chiefly us'd by the *Egyptians* in their obelisks and pyramids, or the tombs of their great men. There are columns of this stone above forty foot high.

The *Grinate* of *Italy* is softer than that of *Egypt*, especially in the quarry, where it cuts with much more ease.

There is also a sort of *green Granite*, which is a species of serpentine, spotted with green and white spots.

The *Granite* of *Dauphiny*, a quarry of which has been found, is only a very hard sort of flint.

GRATEFUL REMEMBRANCE is represented in painting, by a young woman of a graceful countenance, crowned with a branch of juniper with berries on it, holding a great nail, and standing between a lion and an eagle.

The juniper never withers, neither does the memory of benefits received; the juniper is said to help the memory; the nail denotes the tenaciousness of memory; the lion and eagle the remembrance of kindness received, the one is king of beasts, the other of birds, and are both enemies to ingratitude.

G. R. } stands for *Guido Rheni* of *Bologna*, a celebrated  
G. R. F. } painter.

G. R. B. C. F. signifies *Guido Rheni*, in the overthrow of the giants engrav'd by *Bartholomew Coriolano*.

GREEN is one of the original colours of the rays of light.

If urine, citron juice, or spirit of vitriol be cast on a green ribbon, it becomes *blue*, by reason that the yellow of the green-



ing weed is thereby exhaled and consumed, so that nothing but blue remains behind.

Grass and herbs, and even all vegetables, in places expos'd to the open air are *Green*, and those in subterraneous places, or places inaccessible to the air, white and yellow. Thus when wheat or the like germinates under ground, 'tis *white* or *yellow*; and what is in the open air, *green*, tho' this too is yellow before it be green.

*Artificial Greens* are rarely simple colours, but produced by the mixture of *yellow* and *blue*.

Two powders, the one *blue* and the other *yellow*, well mixt appear perfectly *Green*; tho' when view'd with a microscope, we may observe a chequer of blue and yellow.

The dyers make divers shades or casts of *Green*, as *light-green*, *yellow-green*, *grass-green*, *laurel-green*, *sea-green*, *dark-green*, *parrot-green*, and *celaden-green*.

All the *Greens* are first dyed in blue, then taken down with *woad*, *verdegrease*, &c. and then *green'd* with the weed, there being no one ingredient that will give green alone.

*Mountain Green* or *Hungary Green* is a sort of greenish powder found in little grains like sand among the mountains of *Kernansent* in *Hungary*, and those of *Moldavia*.

Though some are of opinion that this mountain green is factitious, and the same with what the antients call'd *flos æris*, prepar'd by casting water or rather wine on copper red hot from the furnace, and catching the fumes thereof on copper plates laid over for that purpose; or by dissolving copper plates in wine, much after the same manner as in making *verdegrease*.

*Painters* make use of this colour for a grass *Green*.

It is sometimes counterfeited by grinding *verdegrease* with *cerufs*.

**GREENS** are allow'd by all persons to depend upon the **YELLOW** and **BLUE**, and any *Green* colour, whatever you please, may be made with them.

*Gamboge* is one of the first yellows, which may be made to produce five or six sorts of *Green* with *verdegrease*, according as the *gambooge* is in the greater or lesser proportion; if it abounds, it will make a tolerable *oak green*, and being mixt with a greater quantity of *verdegrease*, it will make a fine *grass Green*.

But the *yellow*, which some prefer before all others, is made of *French-berries*, which is either deeper or fainter, according as the liquor they are boil'd in is more or less stain'd by them; if it be very thin, it makes a good glaze all over the *verdegrease*, and as it approaches nearer to *Dutch-pink* or *gall-stone*, commands almost any colour we want; being agreeably mixt with the transparent *verdegrease*, and is still transparent. In



## G R E

In like manner a *yellow*, drawn from the roots of *barberries*, and also that drawn from the roots of the *mulberry-tree*, will in a great measure produce the like effect, being mixt with the *transparent verdegrease*.

As for *verdegrease* it self, it produces a fine *bluish Green*, flows readily in the pencil, and may even serve as an ink to write with.

*The way of preparing the transparent VERDEGREASE is as follows.*

Take six ounces of common *verdegrease* (the distill'd *verdegrease* will not answer this purpose so well) break it into little pieces, and boil it gently in a quart of white wine *vinegar*, keeping continually stirring it; when you perceive it to boil, add a little *tartar* broken, continuing still to stir it, till you perceive the liquor of such a colour as you would have it, *i. e.* till it is of a fine transparent *Green*, with a bluish cast, which you may know by dipping in a bit of white paper.

Then pour it through a linen cloth into an open vessel, and set it to cool, and when it is quite cold, keep it in a bottle for use; stop it close, for being expos'd to the air, it will dry; but may be reduc'd again by common water.

This liquor should be touch'd upon part of the lights and shades of a print, and the shades afterwards coloured with *sap green*.

*N. B.* In the making of this *Green*, be sure to make it strong enough; for it cannot be strengthened afterwards, without the trouble of boiling afresh; but may at any time be rendered as faint as you please, by mixing common water with it.

**SAP GREEN** is a colour like that of an oak leaf, if it be us'd thin with common water, for this as well as the former wants no gum; but if it be us'd strong, will produce as dark a green as any.

It will be proper to try colours first on a white *Dutch* tile, and by thinning it with water, you may render it of what strength you please; and may brighten it very much, with adding to it a very little *verdegrease*.

There are two ways of making *sap-green*, viz. Take the flowers of the blue *flag iris*, or *flower de luce*, and press them while there is any juice to be got from them; boil this gently in a glaz'd pipkin till it grows thick; adding a little *alum* to it, and it will make a very useful and lasting *Green*.

*N. B.* You must observe this, that in the boiling of any juice, &c. of the colours before-mentioned, you must always do it in an earthen pipkin; for if it be boil'd in vessels of metal, they will oftentimes change from the colours intended.

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The second way to make a *sap-green* for the washing and illuminating prints, is to take the juice of *buckthorn-berries*; and tho' that juice simply will yield only *dark purple* of a very base hue; yet by adding *tartar* to it, it will change into a good *sap-green*.

Either of these colours will mix with the liquid *verdegrease* above-mentioned, as well as make a delicate shade for it.

There is besides these, another *Green* which is admired by some persons, and that carries a good body with it, and with a degree of transparency too (as it may be made) but as it is commonly us'd, is a colour of a full body, and fit only for painting in miniature.

This is made by mixing *Dutch pink* with *indigo* to what degree of colour they please; but the high preparation of *French berries* with *indigo* (see the Article **YELLOW**S) is much to be preferr'd to *Dutch pink*, especially as this answers all the intentions of *Dutch pink*, and carries a transparency with it, which the *Dutch-pink* has not.

### IRIS GREEN, to make.

Take of the bluest *flower de luces*, which are called otherwise *flag iris*, strip off the upper or sattin part of them, and keep only that; the rest is not good for any use in painting, and pick even all the little yellow nerves, and throw them away too; then pound what you have thus pick'd in a mortar, throwing three or four spoonfuls of water upon it, according to the quantity of flowers you pound; but you must first have dissolved in this water a little *alum*, and a very little *gum Arabick*; and having pounded them well together, strain all through a close cloth, and put this juice into shells, which dry in the air.

#### *Another way.*

Pound your *flower de luce* flowers, pick'd as before, in a mortar, and press out the juice into shells, and salt the juice in each shell with *alum* a little unequally, and you will by that means have *Greens* of different shades.

#### *Another way.*

Pick the flowers as directed in the first, then pound them, and put to them a little *alum water*, and throw in a little powder of quick lime, as if you were salting a fallad. This will both change the colour and cleanse it.

#### *Another better way.*

Pound *alum*, and having bruis'd *French* or *Avignon-berries*, mix them with water, and boil them either over a fire or an ash heat, till the water becomes very yellow; then pound the *flower de luces* in a mortar, and pour a little of this yellow water upon them, according as you would have your *Green*, either *bright* or *sad*; then strain it through a cloth of goat's hair, for  
if

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if it were pass'd through linen, it would not be so good ; and put the juice so strained into large shells, and expose them to all the heat of the sun ; for if they are set in the shade, the *Green* will become mouldy or mothery, and prove too clammy.

*Another way.*

Mince the leaves of the *flower de luce* or *flag iris* very small, and put them into a glass or earthen vessel ; or rather into a copper pot or pan (which is better) with some *alum* and *quick lime* powdered ; let them stand to purify in this state for ten or twelve days ; and when they are rotten, squeeze them into shells.

The *Green* is more lively and rich when the *Green* is only pounded, and the juice squeez'd out at once, without giving them time to rot, having first salted them over with powdered *alum*.

*The way of making a GREEN with the flowers of VIO-  
LETS.*

After the last method you may make a *Green* of the leaves of the *March violets* ; but there must be a greater quantity of them, and this will be a deeper green than that of *iris*. You may, if you please, use *French-berries* bruis'd with *alum* instead of *lime*, which exceeds *lime* for changing *blue* into *Green*.

A *Green* may be laid with the flowers of *Pansies*, after the same manner.

*To make BLADDER GREEN.*

Pound the berries of the bramble call'd *Rhamnus* in a mortar, and sprinkle upon them a little powdered *alum* ; then press or squeeze out the juice, and put it up in a bladder, which tie close, and leave it to dry till the *Green* is grown hard.

*Observations on GREEN colours.*

*Verdegrease.* It is a good *Green*, but subject to decay ; being dry upon paper, it will be of a higher colour than when first laid on ; therefore to preserve it from that fault, dissolve *sap-green*, and it keeps its colour. You may make it fine, by extracting its tincture with spirit of *vinegar*, and then evaporating it to a driness, an ounce of this will be worth ten ounces of the other.

*Verditer* is a light *Green*, seldom us'd in any thing but colouring landscapes, which seem afar off ; and it is good for such a purpose, because it is inclining to blue.

*Sap Green* is a dark, dirty green, never us'd but to shadow other greens in the darkest places, or to lay upon some dark ground behind a picture, which ought to be of a dark *Green* ; but you may do without this colour, for *indigo* mixt with *yellow-berries* makes just such another colour.

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*Copper Green* is an excellent transparent colour of a shining nature, if thickened with the sun or over a gentle fire.

It is the most us'd of any green in washing of prints or maps, especially in colouring of trees, ground, grass, &c. for it is a most perfect *grass Green*.

*The first Sea-GREEN colour for a tincture of Glafs.*

The *Italians* give the colour of *sea-green* to *Beryl*, which is a precious stone found at the foot of mount *Taurus* by the river *Euphrates*, which has the *green-blue* of the sea.

It is found in the *Indies* of a colour somewhat paler, which makes it be call'd by different names; and when the colour is deeper, they commonly pass for other precious stones: it is therefore the water expresses the colour.

This colour, which is one of the finest sky-colours, ought to be made of fine and well purified *crystal*, which the *Italians* call *bollito*; for if it be made of common glafs, it is not so fair; nor must there be any *manganese* put to this colour.

Therefore to make it very fine and beautiful, take *crystal frit*, put it into a pot, set it in a furnace, where being well melted and clear, you must skim off the salt, which will swim on the top like oil, with an iron ladle; for if you should not take it off, the colour would be foul and oily.

The matter having been well purified, you must add to every ten pounds of it or thereabouts, three ounces of the powder of *copper* calcin'd (see *COPPER* calcin'd) with an eighth part of *zaffer* prepar'd, also in powder, and well mixt both together.

In putting both these powders into the pot on the crystalline metal, you must do it by little and little, for fear the *crystal* rising and swelling, should run over, of which care must be taken, by keeping stirring it well all the while.

When this has been done, let the metal stand still and settle for the space of three hours, that the colour may incorporate; then stir it again, and you may then make a trial of the colour.

And it may be wrought twenty-four hours after the mixing of the powders, for by that time it will be well coloured; but the workman must first well mix the whole, for fear the colour should not be precipitated to the bottom, which must always be well observed in all vessels, wherein there are colours, and the doses of the tinctures rightly proportioned.

*Another Sea-GREEN made with less charge to colour glafs.*

Though this colour be inferior to the last, yet it has beauties sufficient to satisfy both the sight, and pay the pains of the workman. He must take the same preparation of scales of *copper* we have mentioned, and the same dose of *zaffer*, with as much *crystal* made of *rochetta* of the *Levant* and *barilla* of *Spain* with-

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out any *manganese* either in the one or other, which has not been cast into water, but well purified from its salt, observing in this place all we have noted to be done in other preparations of *crystal* and *sea-green*, and you'll have a fine sky-colour or sea-green fit for any use.

*Another Sea-GREEN far finer than the rest.*

*Neri* seems to be the inventor of this new *sea-green*, and to have experimented it; it is made with *caput mortuum* of vitriol of *Venus*, without any corrosive, which is a very curious preparation. This *caput mortuum* ought to be expos'd to the air for some days in a place where the sun cannot come, where (by a magnetical virtue) it will attract the universal spirit which will restore to it again part of that it has lost by extraction, and will become of a whitish *Green* colour; then pound it with the same dose of *zaffer* prepared; put the whole in a pot filled with crystal metal very fine and well purified from its salt. Observing all we have noted on this subject, it will make an extraordinary *sea-green*.

GREEN to dye.

### I. To dye an olive-GREEN.

Take clear bran liquors, but stale, a sufficient quantity, *alum* three pounds, *logwood* ground one pound; boil, and enter twenty yards of broad-cloth; boil two hours and a half, cool, and wash it well. Take clear water a sufficient quantity, *beddar* (commonly called *linge*) *heath stravel* or *fustick* as much as may make twenty yards of broad-cloth green; then take water a sufficient quantity, *fustick* a pound, *crust madder*, *nut-galls*, *sumach*, of each four ounces; boil, enter your cloth, handle it well; boil it an hour and a half, and so cool; add *copperas* four ounces, and enter your cloth again; boil half an hour; if you would have it sadder, put in more copperas.

### II. To dye a Poppingjay-GREEN.

Take water a sufficient quantity, *alum* two pounds, *logwood* ground eight ounces; boil, and enter twenty yards of broad-cloth; boil three hours, and make it a bright yellow; then draw it through a cold fat, and then wash it.

### III. To dye a Sea-GREEN.

First make it a sad-blue, then take water a sufficient quantity, *alum* two pounds, *logwood* four ounces; boil, and enter your cloth; boil three hours; then wash it, and make it a bright yellow; after which, draw it through a cold fat; then wash it again.

### IV. To dye a Grass-GREEN.

First make it a sad blue, then take *alum* two pounds; boil and enter your cloth; boil three hours, and wash it; then dip it into a good yellow dye.

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### V. *To dye a French-GREEN.*

Take clear stale *bran-liquor* a sufficient quantity, *alum* two pounds and a half; boil, enter twenty yards of sad blue broad-cloth; boil it two hours and a half, and wash it well. Take water a sufficient quantity, *heath stravel* or *fustick* sufficient; boil well, put in your cloth, and handle it well; then take twenty ounces of *logwood* ground, and put into the dye also *copperas* four ounces (which binds the colour) and if you please, you may new-draw the cloth through a new fat, and handle it; so will it be finished.

### VI. *To dye a Verdegrease-GREEN.*

Take water a sufficient quantity, make it as hot as you can endure your hand in it, in which put *verdegrease* two ounces in fine powder; enter twenty yards of stuff, and handle it well with your hands; let it lye in the liquor all night, stirring it some time, and then let it lie till it is deep enough.

### VII. *To dye a Popinjan-GREEN.*

Take clear stale *bran-liquor* or *sowre tap-wort* a sufficient quantity, *alum* three ounces; boil, and enter twenty yards of broad-cloth, and boil three hours; cool your cloth, and wash it well. Take fair water a sufficient quantity, *neddar* (called also *linge*) or *heath stravel* a good quantity; boil it well, and take it out; then enter your cloth; boil it well, making it a bright yellow. Heat your blue fat, and put in *indigo* bruised small four ounces, *madder* three ounces, *ground malt* two quarts, *new yeast* a quart; mix these things well together, keep them as hot as you can, and let it stand till it will strike blue; then enter your cloth, and handle it well (to avoid spotting) till it is done, and so wash it.

### VIII. *To dye another French-GREEN.*

First make your cloth a good blue, and take the same clean *bran liquor* you take for your greens a sufficient quantity, *alum* three pounds, *logwood* ground four ounces; boil well, enter twenty yards of broad cloth, boil two hours and a half; after take it out, cool it, wash it well. Take fair water a sufficient quantity, good *neddar* or *heath-stravel* so much as will make your cloth a good green. Take fair water a sufficient quantity, *logwood* ground a pound; let them boil, add a little urine; enter your cloth, boil a quarter of an hour; handle it, and so cool it. If you would have it a sad-colour, enter it again, cool, and wash it.

### IX. *To dye a Forest-Green.*

First make your cloth a good blue. Take clear stale *bran liquor* a sufficient quantity, *alum* three pounds, *logwood* ground five ounces; let them boil, enter twenty yards of broad-cloth, handle, and boil it two hours and a half; take it out, cool, and

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and wash it. Take fair water a sufficient quantity, and good *hedder* enough to make your cloth green; boil it well, then enter your cloth, and boil a sufficient time. Take fair water a sufficient quantity, *logwood* ground twenty ounces; boil them a quarter of an hour, cool a little; then enter your cloth, and handle it well, letting it boil about a quarter of an hour longer; after which, cool your cloth, and wash it well.

### X. *To dye a Grass-GREEN.*

First, make your cloth a bright blue, then take clear stale *bran-liquor* or *sowre tap-wort* a sufficient quantity, *alum* three pounds; let them boil, and enter twenty yards of broad-cloth; handle it, boil with a strong fire for two hours, cool, wash it well. Take water a sufficient quantity, *hedder* or *heath-stravel* what you think fit; boil well for an hour; take forth the *hedder*, enter your cloth, handle it well, and let it boil a quarter of an hour; then cool, and put in a little urine; enter your cloth again, boil a quarter of an hour, cool, and wash it well.

*Note*, That the different and various colours of *Greens* arise from the first blue being lighter or fadder, or from the yellow being a deep or light colour.

### XI. *A very good GREEN colour.*

Take *sap-green*, bruise it, put water to it; then add a little *alum*, mix, and infuse for two or three days.

### XII. *To make a very good dye.*

First, dye the cloth or stuff yellow, as we direct in the following; then put it into the blue dye described foregoing.

### XIII. *To make a dark GREEN colour.*

First dye your wool, yarn, stuff, or cloth of a blue colour, as we direct in the foregoing articles; then put it into your yellow dye as in the following, and it will be a dark *Green*.

### XIV. *To dye a Poppingjay-GREEN.*

Make a weak *lixivium* of *pot-ashes*, such as the country people wash their clothes with; put into it *Indigo* a sufficient quantity; then put in your things to be dyed (being first dyed yellow) let it boil, the longer the better, so will the colour be good.

### XV. *A fair GREEN for miniature.*

Grind *verdegrease* with *vinegar* and a little *tartar*, then add a little *quick-lime* and *sap-green*; grind all well together, and keep it in a shell, if it grows hard, with *vinegar*.

### XVI. *To make a very fair GREEN.*

Take *verdegrease*, *tartar*, and *vinegar*, of each a sufficient quantity; boil them all together, and it is done.

### XVII. *Another GREEN for limning.*

Take *blackthorn-berries* gathered at the latter end of *August* when ripe, beat them, boil them eight or ten hours very gently; then



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then add water to make it thinner; strain through a cloth as hard as you can, and add to the liquor *alum* in powder q. 5. some add vinegar, but then it is longer a drying, and will be ruddy. You must keep it in a bladder in the shade, or in the chimney-corner, and it will keep.

### XVIII. *To make Straw-GREEN.*

Boil it in water with *litmose* or *logwood*, and then it will be blue; then boil them in a lixivium of *pot-ashes* and yellow *barberry-bark*, and they will be *Green*.

### XIX. *To make a beautiful liquid GREEN.*

Take *verdegrease* one pound, *tartar* in powder eight ounces, *wine vinegar* a quart; mix all, infuse for one night, and then boil till half is consumed, and filter whilst hot. When you use it, mix *gum ammoniack* and saffron to stiffen it; it will glaze over *buckthornberry-greens*. If you mix it with the juice of those berries and *azure*, it will make several sorts of *Green*.

### XX. *To make GREEN balls.*

Take *buckthorn-berries* a pound, beat and boil them in ten pints of *water* till half is consumed; strain all through a cloth, and put into the liquor as much *cerufs* in fine powder as will make it into a paste, which form into little balls, and dry upon tiles; when dry, stiffen them with dissolved gum. They will be better if you mix with them some *gum ammoniack*.

### *To dye woollen stuffs GREEN.*

First dye the stuffs *yellow* with broom or dye-weed, rinse them well out, and while they are yet wet, pass them through the *blue* dye, and work it, till it is the colour you would have it, either light or dark; so that several shades or sorts of green may be dyed the same way (the stuffs having been always first tinged yellow).

### *A sea GREEN.*

For every pound of stuffs allow three ounces of *verdegrease* powdered, three pints and a half of *wine vinegar*, stir the *verdegrease* in it; pass a pair of stockings through the liquor, and then hang them out without rinsing; when they are dry, wet them in the liquor again, and hang them up to dry again, so oft, till they are perfectly clear'd from all humidity.

### *A brown or iron GREEN.*

Having hung clear rain water over the fire, put in for every pound of woollen powder'd *galls*, *gum*, *brasil* and *copperas*, of each an ounce and half, and *verdegrease* one ounce, boil them well together, stirring them very well; then boil the stuffs in it, till it is to your mind, and when it is cold rinse it out.

### *To dye a lasting brown or iron GREEN.*

For a piece of stuff of fifteen ells, take three quarters of a pound of *allum*, half a pound of *tartar*, two ounces of calcin'd  
*vitriol*;

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*vitriol*; in these boil the stuff for half an hour, then rinse it in clean water, and when it is dried for the *blue*, you may throw away the *allum* fuds.

### *How to blue it.*

The ware being blued with *woad* of a light or deep brown according to your mind, then rinse it again, dry it and prepare it for the following *yellow*. Boil eight pound of broom for half an hour, keeping it down in the kettle with a stick, &c. that it does not float on the top of the water, and when you use it, add to it two quarts of sharp lie, half an ounce of flower of *brimstone*, and an ounce of *verdegrease*; then dye the goods but only once, and it will be of a beautiful brown or *iron Green*.

If you please you may dye the stuff *Green* from a lead colour, and it will be deeper than the former, and last very well; but when it is dyed with brown wood and blued, it will be lighter; but not so firm as the other.

### *To dye linen GREEN.*

Lay the linen a whole night in strong *allum* water dry it well, then boil *broom* or *dyers-weed*, for the space of an hour; take it out and put into the fuds either half or a whole ounce of *verdegrease*, according to the quantity of the ware you have to dye; stir it well about with a stick, and then work the linen in it, once, twice or thrice, as occasion requires, adding the second and third time a quantity of *pot-ashes* equal to an hen's egg; then work your linen the third time, and you will find it of a yellow colour; then dry it in the air, and afterwards throw it into the *blue-vat* (See BLUE) and that will produce the *Green* you desire.

### *To dye thread of a lasting GREEN.*

Boil three quarters of a pound of *Allum*, half a pound of *tartar*, in two quarts of sharp *lye* for an hour, and in it soak the thread for three hours; keeping it hot all the while.

### *Then dye it yellow.*

Put into the kettle eight pound of *broom* one pound of *corn marigold* flowers, half a pound of *crab-tree-bark*, that looks yellow and ripe; and superadd two quarts of sharp *lye*, when these have boil'd half an hour, then dye the thread in the liquor as deep a yellow as possible; but if you can procure *Spanish yellow*, an addition of three quarters of a pound of it will heighten the dye, and render it more lasting; for it is to be remembered, that all *yellows* that are design'd to be dyed *Green*, must be as deep as possibly they can be.

### *After this turn it GREEN with BLUE dye.*

There are in this as in the foregoing receipt, four operations in dying a good *Green*, that you may make it either a light or a dark *Green* at pleasure: for first,

You

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You may *blue* the thread with *woad*, or else with *indigo*, being first thrown into the *allum* suds, and afterwards into the *yellow*, and you will have a lasting *Green*. So that *Green* is to be dyed several ways.

### *Another green for thread.*

First fill the kettle with sharpe *lye*, and then throw in a bundle of *broom*; boil them very well, and then pour off the liquor into a vat, and for every pound and half of thread, allow half an ounce of *verdegrease*, and half an ounce of *allum*; put these into a quart of *lye*, in which brown *brasil* wood has been boil'd; stir them together and pour them into the *broom* water; and in this mixt liquor, lay the thread in soak for one night, and you will find it well dyed.

### GREENS for SILKS.

For every pound of *silk* take a quarter of a pound of *English allum*, two ounces of *white wine tartar* beaten small, dissolve them together in hot water, then put in the *silk*, letting it lie a whole night, then take it out and dry it; having done this, take a pound of *broom*, boil it in a pail and a half of water for an hour or better, then take out the *broom* and throw it away, and put in half an ounce of beaten *verdegrease* stirring it about with a stick; then put in the *silk* for a quarter of an hour, take it out and let it lie till it is cold; then put in one ounce of *pot-ashes*, stir them about and put in the *silk* again, keep it there till you think it is yellow enough, then rinse it out and let it dry; after which put it into the blue dye fat or copper, and let it remain there till it becomes *Green* and dark enough; then take it out and you will have a good *Green*, to be beaten and dry'd.

You may let it lie a longer or less while in the dye according as you would have the *Green* lighter or darker; for at first you will have but a faint *Green*.

### *Grass* GREEN.

First dye your silk a pretty deep straw colour, rinse it clean and wring it close together with sticks; and then put about fifteen or twenty handfuls of skains into the blue dye copper; though you must take care that the strength of the dye be proportioned to the quantity of silk; and that you do not put in too many skains at once.

When it has boil'd enough take the kettle off, and let it stand for an hour; after which time you may work it again, and do the same every hour, allowing the same interval; but you must be very careful that one handful does not lie longer in than another, and when it is taken out of the copper, let it be very well cool'd, rins'd and strongly wrung with sticks, and afterwards dry'd.

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### *To dye parrot or parroquet GREEN.*

This being something lighter than the other, must be boil'd in weaker suds than the other, and as soon as it is dyed, must be wrung and dry'd as the other.

### *To dye green finch or canary bird GREEN.*

This must be dyed as the *Green*; but you ought to add a little *Provence wood* to the last suds, according to the quantity of the silk; after which it must be boil'd in the blue copper, wrung out and rinsed.

### *To dye olive GREEN.*

This also must be dyed as the *Green*, only the last suds must be encourag'd with a little *Provence wood* suds, till it is deep enough; then wring it out, &c. as above.

### *To dye a celadon or celandine GREEN.*

This colour being very light and bright, must be dyed as the *sea Green*, and boil'd in weak suds, and managed as the *Green*, and dry'd.

### *To dye a sea GREEN.*

This colour also being very light, must be perform'd as the lemon colour, and thrown into blue suds, then wrung out and dry'd.

### *Another sea GREEN.*

For every pound of silk take three ounces of *verdegrease* pounded small, put it into good *wine* or sharp *vinegar* to dissolve, let it lie a whole night in it, in the morning set it over the fire and make it hot, stirring it about with a stick; and then put in the silk, (but take care not to let it boil) and let it remain two hours, or one, or half an hour according as you would have the colour a deep, middling or light *Green*; then put some boiling hot water into a fat or tub, to which add half an ounce or an ounce of soap, and make a lather; when it froths it is ready; then hand the silks in it, let them drop afterwards, and rinse them in river water, beat them very well, and dry them.

JOHN GREENHILL, was a gentleman descended from a good family in *Salisbury* where he was born, he was disciple to *Sir Peter Lely*, whose manner in a short time he successfully imitated, and became a great proficient in crayon draught as he afterwards did in painting; he failed very little of his master's excellencies, who first neglected, and then became jealous of him as a dangerous rival; for he never let him see him paint but once, and that was by stratagem. Mr. *Greenhill* had long had a desire to see *Sir Peter* manage his pencil, but so shy was that great artist of revealing his mystery, that he would never lend him the least assistance all the while he was with him; which made Mr. *Greenhill* after he had left him, have recourse to a wile to procure

cure that which he must have otherwise despaired of. He procured Sir *Peter* to paint his wife's picture, through which means he had an opportunity to stand behind and see what he did; which being greatly to his satisfaction on a double account, he made his master a present of twelve broad pieces, and so took the picture away with him, having thus obtain'd his end; he in a little time became exceeding famous for face painting; inso-much, that had he not died young, *England* might have boasted of a painter, who according to his beginnings, could not have been much inferior to the very best of foreigners.

GREY to dye.

1. *Silver Grey colour.* Take *water* a sufficient quantity, of *nut-galls* bruis'd small two ounces, *tartar* bruis'd three ounces, boil them, enter twenty yards of stuff or cloth, &c. handle and boil an hour and half, cool it; then put in *copperas* a sufficient quantity, enter your cloth again at a boiling heat, handle it, boil a quarter of an hour, and so cool, if you would have it fadder, put in more *copperas*.

2. *To dye a light Grey colour.* Take *water* a sufficient quantity, *nut-galls* bruis'd small four ounces, *white tartar* bruis'd small four ounces, make them boil; then enter twenty yards of broad cloth, and handle it, boiling an hour and half, cool your cloth, and put in *copperas* an ounce and half, enter your cloth again and handle it, boil it a quarter of an hour, and cool it; if you would have it fadder, put in more *copperas*.

3. *To dye lead colour.* Take *water* a sufficient quantity, *nut-galls* bruis'd small one pound, *madder* half a pound, make them boil, enter twenty yards of broad cloth, boil an hour, take it out and cool it; then add to the liquor *copperas* four ounces, boil and put in your cloth again, handle it a quarter of an hour, after, which take it forth and wash it.

4. *To dye another lead colour.* Take *water* a sufficient quantity, *nut-galls* bruis'd small a pound, *red-wood* ground two ounces, boil all together, enter twenty yards of broad cloth, and handle it, and boil it an hour and half, take up your cloth and cool it; after which put in *copperas* eight ounces, enter your cloth again at a boiling heat, and handle it and let it boil half an hour, and cool it, if you would use more *copperas*; *Note*, that the quantity that dyes twenty yards of broad cloth, will dye forty yards of stuff.

5. *To make a fair russet colour.* Take *water* a sufficient quantity, *Brasil* ground one ounce, boil it an hour, *grains* in powder half an ounce, boil and enter your wool, yarn, cloth, &c. boil an hour, cool and add *copperas* four ounces, enter your matter again, boil and cool, &c.

6. *Another*

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6. *Another russet colour.* Take water a sufficient quantity *Brasil* in powder, *red-wood*, of each half a pound, *nut-galls* two ounces, *copperas* four ounces, mix and boil an hour, enter the matter you would die ; let it lie twenty four hours.

7 *To dye a dark GREY.* For every pound of woollen ware, use a quarter of a pound of *copperas*, and a quarter of a pound of *brown wood*, (or *walnut-tree wood*).

*To finish it.* Take two ounces of *brown-wood*, and half an ounce of *copperas*.

### *A silver GREY.*

Boil the goods with two ounces of *allum*, and two ounces of *pot-ashes*, for every two pound of woollen ; which let lye in it one whole night, and then boil it.

*Then to finish it.* Dissolve two ounces of *sal armoniack*, two ounces of *litharge of silver*, two ounces of bright *foot*, a dram of *crystal of tartar*, together for one night ; boil them an hour, and pass the woollen stuffs through it.

### *To dye stuffs, &c. a LAVENDER GREY.*

Heat a proper quantity of clean rain water in a kettle, and for every pound of stuff, take an ounce of blue *lac* beaten small, and half an ounce of pounded *galls*, and the same quantity of *vitriol* ; boil them together, and put in the stuffs, and boil them for half an hour.

This dye is proper for flight ware, as stockings and coarse stuffs ; but not for the better sort.

### *To dye silk a good GREY.*

This you may prepare as the tawney dye, and after you have wrung out, rinsed and beaten it, if it be browned, it becomes a good Grey.

### *To make silk a brimstone WHITE.*

Boil the silk as for pearl colour, with the addition of a little blue lye, and for every pound of silk, add six ounces of soap ; rinse the silk in it, wring it very well out of the dye, and hang it upon very white poles, and after that in a close room, setting a shovel or pot of fire under it ; upon which strew *brimstone*, shut the room close, and the next morning dry it in the air.

GRIEF is represented in painting by a man naked, manacles upon his hands, and fetters on his feet, encompassed with a serpent gnawing his left side, and he seeming to be very melancholy.

The fetters denote the intellects that discourse and produce irregular effects, being straitned by perplexity, and cannot attend to their accustomed operations ; the serpent signifies misfortunes and evils, which occasion destruction, which is the chief cause of Grief.

## GRINDING

## G R O

**GRINDING** *Glass* for looking glasses, &c. is perform'd after the following manner.

In the new method of working large plates of *Glass* for looking glasses, &c. by moulding, and as it were casting them somewhat after the manner of metals, that you will find under the article GLASS. The surface being left rough, it remains to be ground and polish'd.

In order to this, the plate of *Glass* is laid horizontally on a large stone in the manner of a table, and to secure it the better plastered down with *plaster of Paris*, &c. that the effort of the workman or of the machine us'd in grinding, may not displace or loosen it. This stone table is sustain'd by a wooden frame, the bottom or base of the *Grinding* machine is another rough *Glass*, about half the size of the *Glass* design'd principally to be ground; on this upper *Glass* is a plank of wood cemented to it, and upon this are set weights to promote the triture or wearing off the surface of the rough cast *Glass*.

This table or plank is sometimes fastened to a wheel, which gives it a motion.

This wheel, which is at least five or six inches diameter, is made of a very hard but light wood, and is wrought by two workmen plac'd against each other, who push and pull it alternately; and sometimes when the work requires it, turn it round.

By such means, a constant mutual attrition is produc'd between the two glasses; which is assisted by water and sands of several kinds, which is caus'd to pass between them; sand being apply'd still finer and finer, as the *Grinding* advances, and at last *emery* is us'd.

As the upper or incumbent *Glass* polishes and grows smooth, it is shifted from time to time, and others put in its place.

But only the largest size glasses are thus wrought with a wheel or machine, the middling and smaller sorts being wrought by the hand.

**GROSSNESS** is represented in painting, by a gross corpulent woman, holding an olive branch in her right hand bearing fruit without leaves, in her left a crab.

The olive branch denotes fatness; the crab as much subject to fatness, where the moon increases either from the particular quality of the moon, or else because when it is full moon; the crab has by the light a fairer opportunity to procure its food.

**GROUND** *for a LIMNING or painting after the life.*

The *Ground* behind a picture in miniature, &c. is commonly *blue* or *crimson*, imitating a curtain of *sattin* or *velvet*; if it be to be *blue*, you must lay it on as follows; wash *bice* till it is very pure and clear, and temper a quantity in a shell sufficient for your *Ground*, and let it be thoroughly moist and  
well



## G R O

well bound with *gum*. Then with a small pencil go about with the same colour, the *pourfile*, that is the utmost stroke and ambient superficies of the picture; having done this, take a larger pencil, and therewith wash over something carefully the whole *Ground* that you design to cover with a *blue*, somewhat thin and waterish, and then with a pretty large pencil full of colour and flowing lay over that place with a thick and substantial body of colour, which you had only wash'd over before; in the doing of this you must be very quick, keeping the colour moist that you have laid, not suffering any part to dry till you have covered the whole. See SATTIN and VELVET.

If you would have your *Ground* a crimson like *sattin*, then trace out where and in what places you will have these strong and hard lights and reflections to fall, which are seen in *sattin* or *velvet*, with *Indian lake*; there lay your lights with a *lake* that is thin and waterish, and while it is yet wet, lay the deepening and hard strong shadows with a stronger and darker colour of *lake* thick ground; close by the other lights. The best way for imitation is to have a piece of *sattin* before you to imitate.

**GROUP**, [in *painting* and *sculpture*] is an assemblage or knot of two or more figures of men, beasts, fruits or the like, which have some apparent relation to each other.

In a good painting it is necessary, that all the figures be divided into two or three *Groups* or separate collections.

Thus they say, such a thing makes a *Group* with such and such others of different nature and kind.

A *Group* has somewhat in it of the nature of a symphony or concert of voices; as in the one the voices must sustain each other, in order to fill the ear with an agreeable harmony from the whole; whence if any part were to cease, something would necessarily be miss'd; so in *Groups*, if the parts or figures be not well balanc'd, something will be found disagreeable.

There are two kinds of *Groups*, or two manners of considering *Groups*, with respect to the *design* and to the *clair obscure*; The first is common both to works of painting and those of sculpture.

*Groups* with respect to the *design* are combinations of divers figures, which bear a relation to each other, either upon the account of the *action* or of their *proximity* or of the effect they have. These we conceive, in some measure, as representing so many different subjects, or at least so many distinct parts or members of one greater subject. See DESIGN.

*Groups* with respect to the *clair obscure*, are bodies of figures, wherein the lights and shadows are diffus'd in such manner,

## G U M

that they strike the eye together, and naturally lead it to consider them in one view.

**M**

MATTHEW GRUNEWALD, firnam'd of *Afchaffemberg*, painter and engraver, after the manner of *Albert Durer*, us'd this mark. He liv'd in the year 1510.

**L**

LEONARD GUALTIER, us'd this mark.

G. S. F. stands for *Gio* or (*John*) *Sirani Fecit*.

GUIL. Baur, 164. stands for *William Baur*, painter to the Emperor.

GUM, a vegetable juice, that exsudes through the pores of certain plants, and there hardening into a tenacious transparent mass.

*Gum* is properly one of the juices of the bark, it is drawn thence by the heat of the sun, in the form of a glutinous humour; and is by the same cause afterwards inspissated, concocted and rendred tenacious.

The character by which *Gums* are distinguish'd from *resins* and other vegetable juices, is that they are dissoluble in water, and at the same time inflammable by fire.

In the general, they are more viscid and less friable, and generally dissoluble in any aqueous menstruum; whereas *resins* are more sulphureous, and require a spirituous dissolvent.

*Gums* are different according to the different trees, roots, &c. out of which they ouze; they are by some authors distinguish'd into aqueous and *resinous Gums*. The first are such as are dissolvable in wine, water and the like fluids; the second are those only dissolvable in oil.

There are various sorts of *Gums* of which I shall here mention only the chief, as

*Gum Anima* } is a *resinous* juice, ouzing from a tree, which

*Gum Animi* } is by the *Portuguese* call'd *courbari*, growing in divers parts of *America*.

This *Gum* is very hard and transparent, of an agreeable smell not unlike *amber*, it neither dissolves in water nor oil, and consequently is not properly accounted a *Gum*.

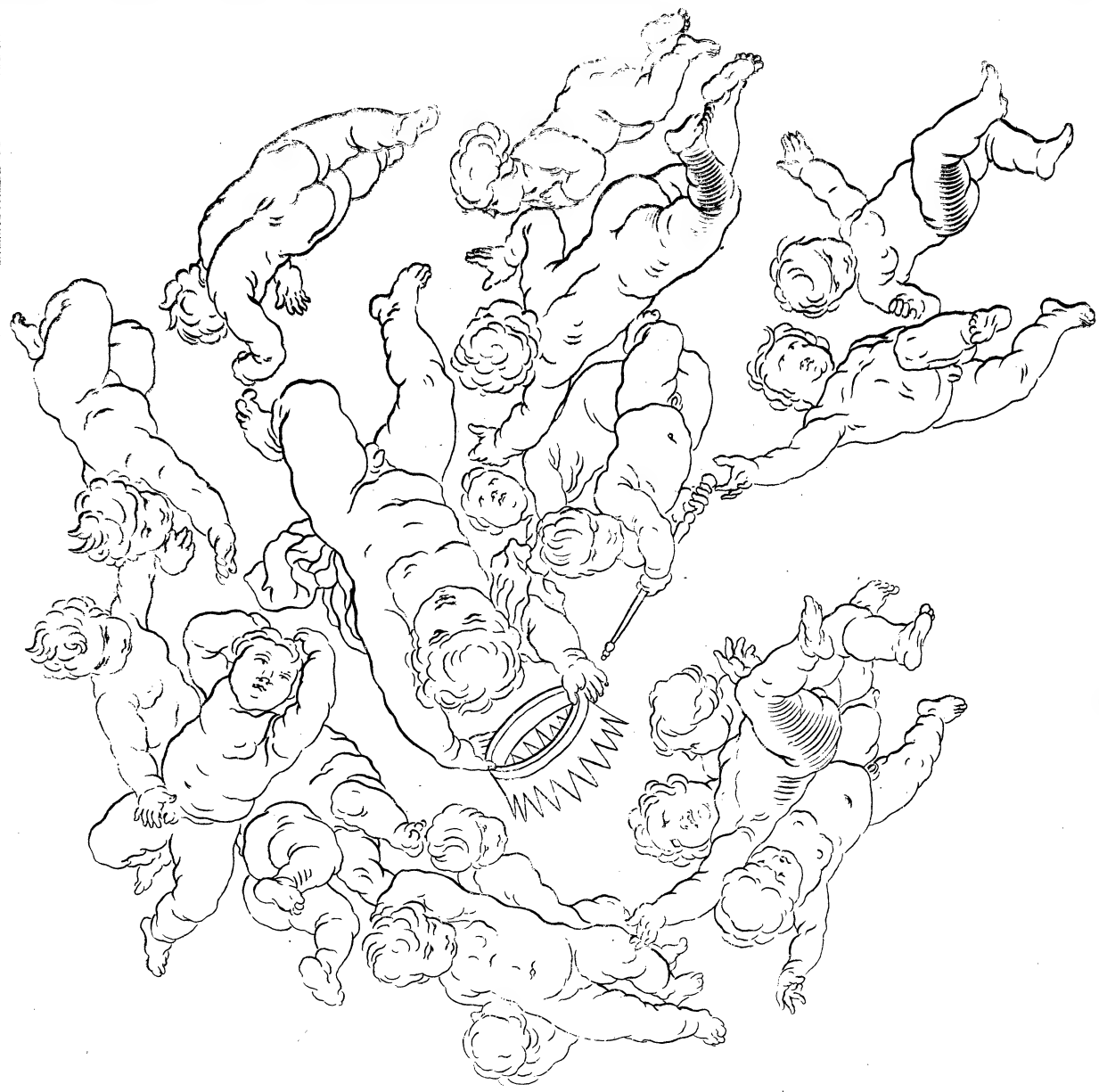
Instead of this *Gum copal* is frequently substituted.

*Gum Arabic*, is the juice of a little tree growing in *Egypt*.

It is very transparent and glutinous upon the tongue, almost insipid to the taste, and twisted somewhat in the form of a worm.

*Gum Gutta* } is a *resinous Gum* brought from the kingdom  
*Gutta Gamba* } of *Siam*, &c. in large pieces fashion'd not un-  
*Gamboche* } like sausages, hard, brittle and very yellow.

It





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It ouzes from incisions made in a prickly kind of shrub, climbing up the neighbouring trees.

It serves to make a yellow colour for painting in miniature.

*Gum Senegal* is the *Gum* ordinarily sold by druggists for *Gum Arabic*, which it resembles very nearly both as to form and virtue.

It is either white bordering on the yellow, or of a deep *amber* colour, transparent, &c. it ouzes out of a prickly shrub, common enough in *Africa*, and is brought to us from *Senegal*.

GUMMO RESIN is a hardened juice of a middle *resin*;

GUM ROSIN being both dissoluble in *aqueous menstruums* like a *Gum*, and in oily ones, like a *resin*.

Such are *mastic*, *camphire*, *storax*, &c.

GUMS. The chief of all is *Gum Arabic*, that which is white, clear and brittle; the *Gum water* of it is made thus.

Take *Gum Arabick*, bruise it, and tye it up in a fine clean linen cloth; then put it in a convenient quantity of pure spring water in a glass or earthen vessel, letting the *Gum* remain there till it is dissolv'd; which being done, if the water be not stiff enough, put more *Gum* into the cloth; but if too stiff, add more water.

Of which *Gum water* have two sorts by you, the one strong and the other weak; of which you may make a third at pleasure.

But if *Gum Arabick* is not to be had, use the following preparation of sheep's leather or parchment.

Take the shreds of white sheep skins, (which are to be had at the glovers) or else cuttings of parchment one pound, of conduit or running water two quarts; boil it to a thin gelly, then strain it whilst hot through a fine strainer, and so use it.

*Gum lake* is made with *whites* of eggs, beaten and strain'd a pint, *honey*, *Gum Hedera*, of each two drams, strong wort four spoonfuls, mix them and strain them with a piece of sponge, till they run like a clear oil, which keep in a clean vessel, till it grows hard.

This *Gum* will dissolve in water like *Gum Arabick*, it is a good ordinary varnish for pictures.

*Gum Hedera* is gotten out of *Ivy*, by cutting with an ax

*Gum of Ivy* is a great branch thereof climbing upon an oaken tree, and bruising the ends of it with the head of the ax; at a month's end or thereabouts, you may take from it a very clear, and pure fine *Gum*, like oil.

This is good to put into *gold size*, and other colours for these three reasons.

1. It abates the ill scent of the *size*.

2. it will prevent bubbles in *gold size*, and other colours.

M m 2

3. Lastly,

## H A I

3. Lastly, it takes away the fat and clamminess of colours.

*Gum Ammoniacum* is a foreign Gum, and ought to be bought strain'd. Grind it very fine with juice of *garlick*, and a little *Gum Arabick water*, so that it may not be too thick; but that you may write with it what you will.

When you use it, draw what you will with it, and let it dry, and when you gild upon it, cut your *gold* or *silver* to the fashion you have drawn with the *size* or *gum*; then breathe upon the *size*, and lay the *gold* upon it, gently taken up, which press down hard with a piece of wool, and then let it be well dry'd; when it is dry'd, strike off the loose *gold* with a fine cloth; and so what was drawn will be fairly gilded, if it were as fine as a hair. It is call'd *gold ammoniack*.

G. V. S. G. signifies, *Van Scheendel Fecit*, and V. V. *Buy-tuvech inv.*

## H.

**H**AIR, [to paint in miniature] lay on *bistre*, *oker*, *white* and a little *vermilion*, but when it is dark, you must use *black* instead of *oker*; and then shade with the same mixture, diminishing from the *white* and finish with the *bistre* alone, or mix'd with *oker* or *black*, by fine thin strokes, very near to each other, waving and curling them, according to the turn of the *Hair*.

You must also refresh the lights with fine turns of *oker* or *orpiment*, or *white* and a little *vermilion*; after which blend away the lights into the shades, working sometimes with *brown*, sometimes with *pale*.

As for the *Hairs* upon and round the fore-head, through which the flesh is seen, they must be coloured with the colour of flesh, shading and working beneath, as if you design'd there should be none; then shape them and finish them with *bistre*, and refresh the lights as you did the rest.

**H**AIR of women and children is coloured with simple *brown oker*, and heightened with *masticote*; the same in the *Hair* of men, only making it sadder or lighter as the life requires.

*Hair* which is black may be coloured with *soot*, or *lamp black*, but it will abide no heightening.

Children's *Hair* is sometimes laid with *brown oker*, and *white*, and heightened with the same; and sometimes with *allum*.

Sometimes also it is done with *light oker*, and deepened with *brown oker*, and heightened with *masticote* simple.

Old women's *Hair* is coloured with *brown oker* and *black*, heightened with *brown oker* and *white*.

## GREY.

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GREY HAIRS are coloured with *white*, *black* and *bistre*, and finish'd with the same mixture, but stronger, heightening the lights with a very pale *blue* and *white*.

But the matter of the greatest importance is to soften the work, to run the tints into one another, as well as the *Hair* on and about the face into the flesh, taking especial care that you work not dry or hard, and that the out-lines of the flesh be not cut.

You must accustom your self to mix with *white*, but just as you want more or less of it; for the second colouring must be always a little deeper than your first, except it be for softening.

The various colourings may be easily produc'd by taking more or less *red*, *blue*, *yellow* or *bistre*, whether for the first colouring or for finishing.

The colouring for women should be bluish, for children a little red, both fresh and gay; and for the men it should incline to *yellow*.

### *Of dying Hair colours.*

1. *To dye Hair colours.* Take water a sufficient quantity, *allum* three pounds, with which *allum* twenty yards of broad cloth; and after which make it of a bright *yellow* with *fustick*. Then take water a sufficient quantity, *nut-galls* in powder two pounds, *madder* in powder four ounces, let it boil an hour; then take it out and cool it; after which put in *copperas* eight ounces making it boil, put in your cloth, handle it well about a quarter of an hour; take it out and cool it, if it is not sad enough; put it in again, for the oftener you take it out and put it in, the sadder it will be.

2. *Another Hair colour.* Take water a sufficient quantity, *allum* three pounds, enter twenty yards of broad cloth, boil it three hours; take it out and wash it well, and make it a bright *yellow*. Take *nut-galls* eight ounces, *madder* four ounces made small, put them in your cauldron and let them boil; enter your cloth and handle it well, boil one hour, then take it out and cool it; add to the former things *copperas* eight ounces, let it boil, put in your cloth again, handle it well, and repeat this work till it is sad enough.

3. *A Hair or cloth colour.* Take water a sufficient quantity, *crust madder*, *nut-galls*, *sumach*, *red-wood* ground, of each a pound, boil them, enter twenty yards of broad cloth, boil an hour, sadden with *copperas* six ounces.

4. *Another Hair colour.* Take water a sufficient quantity, *nut-galls* eight ounces, *fustick* one pound, *madder* four ounces, *red-wood* two ounces, make them boil, enter twenty yards of stuff, &c. and boil two hours, cool your cloth, and put in *cop-*



# H A I

*peras* four ounces; enter your cloth again, handle and boil it a quarter of an hour, then cool it, put in more *copperas*, if you would have it sadder.

5. *Another Hair colour.* Take water a sufficient quantity, *fustick* eight ounces, *nut-galls* bruised small six ounces, *red-wood* ground four ounces, make them boil; then enter your cloth, &c. and boil two hours and a half, afterwards cool and sadden it with *copperas* eight ounces. This will serve for twelve pounds of wool, yarn, cloth, &c.

*Another.*

There are several different shades of this colour.

Some do it with *alder-bark*, *Walnut-shells*, *green-oak chips*, (otherwise they crumble like dust.)

They use for the first suds two pounds and a half of *allum*, and one pound of *tartar*; boil them for an hour and a half, and then pour off the water.

Others first prepare the stuffs with *galls* and *copperas*, and dye them *red*, and then *yellow*; to redden them they use seven pound of *madder*, and after that pass them thro' the *yellow* copper, and after that, through the *copperas* and *gall* suds; so that whatever colours you would dye, either light *reddish* or *yellowish*, you must order it according to a pattern the workman is to follow.

*Another.*

SOOT dye or HAIR colour is prepar'd as follows: First *allum* the goods and dye them *yellow*; then dye them to an ash-colour with *galls*, *brown-wood* and *madder*, then add a little *copperas*, and you will have a *Hair* colour.

Take notice that this is proper for woollens, but not for linens.

*The several MIXTURES for SHADOWING HAIR.*

1. *White* and *Roman oker* for light *Hair*.
2. *White* and *yellow oker* for lighter *Hair*.
3. *White* with *rust* and *Roman oker*.
4. *Light pink* with *sea-coal* and *yellow oker*.
5. *Dark pink* with *rust* and *Roman oker*.
6. *Pink* with the best *rust* and *gall-stone*.
7. *Florence pink* with *lake* and *burnt-ivory*, a good shadow for *Hair* and *face*.
8. *White* with *umber* and *yellow oker* for light *Hair*.
9. The last mixture with more *umber* and *cherry-stone-black*, for a deeper *Hair*.
10. *Yellow oker* with *umber* and *cherry-stone-black*, for a dark *Hair*.
11. The last mixture with *umber* and *cherry-stone-black*, for a darker *Hair*.

To do these things artificially, you may temper the natural colours with your pencil upon your pallat, being first plac'd in order; then wet your pencil in water, and temper upon the colour you intend to make use of first in your mixture; then rub your pencil on a clean place of your pallat, leaving part of the colour upon the place.

And in the same manner take from as many of the other as shall be directed for such and such temperatures or mixtures. Or thus;

Dip your finger in water, and temper or mix your colours as you did with your pencil, placing your colours so mixt upon your pallat in order.

**HANDLING.** By this term is understood the manner in which the colours are left by the pencil upon the picture; as the manner of using the pen, chalk, or pencil in a drawing, is the handling of that drawing.

This consider'd in itself abstractedly, is only a piece of mechanicks, and is well or ill as 'tis perform'd with a curious, expert; or heavy, clumsy hand; and that whether 'tis smooth or rough, or however 'tis done; for all the manners of working the pencil may be well or ill in their kind, and a fine light hand is seen as much in a rough, as in a smooth manner.

It is delightful to see a freedom and delicacy of hand in painting, as in any other piece of work; it has its merit. Though to say a picture is justly imagin'd, well disposed, truly drawn, is great, has grace, or the other good qualities of a picture, and withal, that 'tis finely handled; is as if one should say a man is virtuous, wise, good natur'd, valiant, or the like, and is also handsome.

But the handling may be such as to be not only good abstractly consider'd, but as being proper, and adding a real advantage to the picture; and then to say a picture has such and such good properties, and is also well handled (in that sense) is as to say, a man is wise, virtuous and the like, and is also handsome, and perfectly well bred.

Generally if the character of the picture is greatness, terrible or savage, as battles, robberies, witchcrafts, apparitions, or even the portraits of men of such characters, there ought to be employ'd a rough bold pencil; on the contrary, if the character is grace, beauty, love, innocence, &c. a softer pencil, and more finishing is proper.

'Tis no objection against a sketch if it be left unfinish'd, and with bold rough touches, though it be little, and to be seen near, and whatsoever its character be; for thus it answers its end, and the painter would after that be imprudent to spend more time upon it. But generally small pictures should be well wrought.

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Jewels, gold, silver, and whatsoever has a smart brightness, require bold rough touches of the pencil in the heightnings.

The pencil should be left pretty much in linen, silks, and whatsoever has a glossiness.

All large pictures, and whatsoever is seen at a great distance, should be rough; for besides that 'twould be a loss of time to a painter to finish such things highly, since distance would hide all that pains; those bold roughnesses give the work a greater force, and keep the tincts distinct.

The more remote any thing is suppos'd to be, the less finishing it ought to have. I have seen a fringe to a curtain in the back-ground of a picture, which perhaps was half a day in painting, but might have been better done in a minute.

There is often a spirit and beauty in a quick, or perhaps an accidental management of the chalk, pen, pencil or brush in a drawing, or painting, which 'tis impossible to preserve if it be more finish'd, at least 'tis great odds but it will be lost; 'tis better therefore to incur the censure of the injudicious, than to hazard the losing such advantages to the picture. *Apelles* comparing himself with *Protogenes* said, perhaps he is equal, if not superior to me in some things, but I am sure I excel him in this; I know when to have done.

Flesh in pictures to be seen at a common distance, and especially portraits, should (generally speaking) be well wrought up, and then touch'd upon every where in the principal lights and shadows, and to pronounce the features; and this more or less, according to the sex, age, or character of the person, avoiding narrow or long continued strokes, as in the eye-lids, mouth, &c. and too many sharp ones; this being done by a light hand, judiciously gives a spirit, and retains the softness of flesh.

In short, the painter should consider what manner of *Handling* will best conduce to the end he proposes, the imitation of nature, or the expressing those rais'd ideas he has conceiv'd of possible perfection in nature, and that he ought to turn his pencil to; always remembering that what is soonest done is best, if 'tis equally good upon all other accounts.

There are two mistakes very common; one is, because a great many good pictures are very rough painted, people fancy that it's a good picture that is so. There is *bold painting*, but there is also *impudent painting*. Others on the contrary judge of a picture not by their eyes, but by their fingers ends, they feel if it be good.

Those appear to know little of the true beauties of the art, that thus fix upon the least considerable circumstance of it, as if it were all, or the principal thing to be consider'd.

## H A N

The cartoons, as they are properly no other than colour'd drawings, are handled accordingly, and extremely well. The flesh is generally pretty much finish'd, and then finely touch'd upon. There is much hatching with the point of a large pencil upon a prepar'd ground. The hair is made with such a pencil for the most part.

*Leonardo da Vinci* had a wondrous delicacy of hand in finishing highly, but *Giorgion* and *Correggio* have especially been famous for a fine, that is a light, easy, and delicate pencil. You see a free bold *Handling* in the works of *Titian*, *Paolo Veronese*, *Tintoretto*, *Rubens*, the *Borgognone*, *Salvator Rosa*, &c. *Mattefe* had a very particular manner, he painted chiefly *Turkey-work'd* carpets, and left the pencil as rough as the carpet itself, and admirably well in its kind. For works at a great distance, *Lanfranc* had a noble manner of *Handling*; as particularly in the *cupola* of *St. Andrea della Valle*, which is in *Fresco*, and where the colours are flung on with a sponge instead of a pencil or a brush; not for a whim, but as most proper to the purpose; and an eye (for example) appears not near, as one rude spot, but as it ought at its intended distance.

Perhaps no man ever manag'd a pencil in all the several manners, better than *Van-Dyck*.

### *Of drawing* HANDS and FEET.

It requires some time to practise drawing of *Hands* and *Feet*, before you proceed to the drawing of whole bodies; because it will be too difficult to enter upon them, till you have been pretty well practis'd in the drawing the several limbs and parts of them, especially the *Hands* and *Feet*, which are the most difficult parts of the body to draw, next to the face, and by practising of these you will be able more readily and easily to attain the less.

And it is certainly most commendable exactly to draw a *Hand*, which hath so many varieties of posture and action, which will be found very difficult to imitate in every one of them, in the spirit and life of them, without some lameness, or imperfection.

The actions and postures of the *Hand* are so various, that no certain rule can be given for the drawing them; but you may take this for a general rule; that when you first draw it with charcoal, you are not to draw it perfectly, that is to say, to make all the joints, or veins, or other things to appear but either lightly or faintly; to touch out the bigness of the *Hand*, and the manner of turning it with faint touches, and not with hard strokes; and when you have done that as it should be, part the fingers asunder or close according to your pattern, with the like faint stroke; then mark that place where any of the fingers stand out from others, and make a faint resemblance of it.

When

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When you have done this, if you find your draught to be right, proceed to draw it more perfectly; and make the bending of the joints, the wrist bone, and other principal parts more exactly.

Then in the last place, go over it again, and draw every small bending or swelling of the fingers, and make the nails, knuckles and veins, so many of them as appear, and every thing else that you can discern.

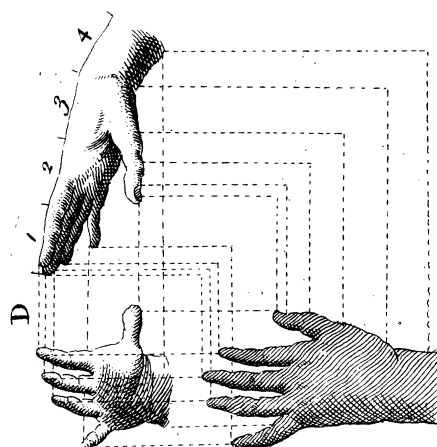
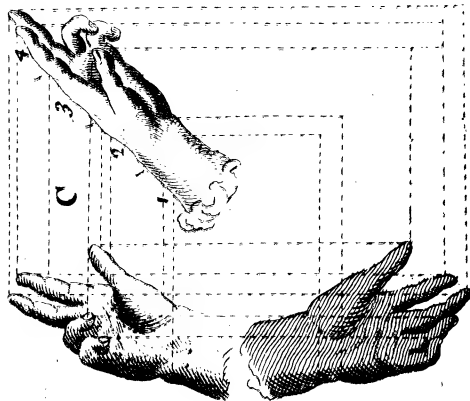
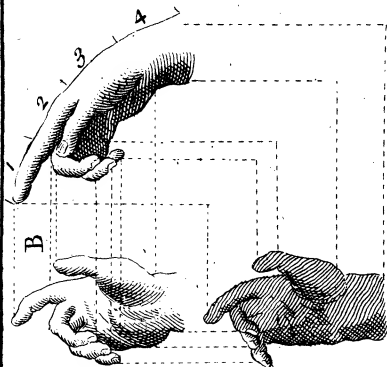
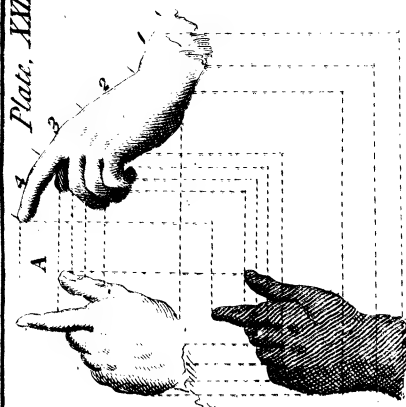
Observe this rule in all your drawings, that before you set about drawing your draught with *black-lead* or other things, you must blow off the loose dust of the coal from your drawing, or faintly whisk over your drawing with a feather, that so you may leave it so faint, as but just to perceive your strokes; and by this means you will the better see how to draw it over again with *black-lead*, or else you would not be able to discern your strokes.

As for the proportion of a *Hand*, you have it set down in the plate (here inserted) by lines and figures, which shew the equalities of proportions in a *Hand*, and how many equal measures there are in it, which it will not be improper for you to acquaint your self with, that you may by that means know when a *Hand* is well proportioned with just and equal distances.

But you ought not to forget this, that according as the *Hand* turns one way or other, the proportions must be fore-shortened, according as they appear to the eye; so much as the *Hand* turns away from our sight, so much it loses of its ordinary proportion, and is made to shorten to that proportion, that the eye judges of it; nay, sometimes a whole finger, sometimes two or three, or more are lost to our sight, by the turning of the *Hand* another way from us, and so they must be wholly left out, and not made.

The proportion of the *Hand* consists of three measures, of the nose, of which you are to make three equal prick'd squares, mark'd perpendicularly 1, 2, 3, the lowest of which squares is divided into two equal parts, thereby to adjoin a half, making a third part unto that base, mark'd also 1, 2, 3, which is given to the ball of the thumb and fore-finger near to the said thumb, raising a prick'd line perpendicularly up unto the top of the right *hand* angle of the square, mark'd above with I, making a prick'd quill, within which the fore-finger is contain'd, the length and top of which exceeds the upper joint of the middle-finger; that being divided into three equal parts, the two equal joints or the two upper parts shall be of equal height to the upper part of the little-finger, as appears in the figure of the *Hand*, represented at B, and the thumb shall not exceed the second or middle joint of the fore-finger.

Then











## H A N

Then there remains a fourth measure for the wrist, which is the measure of the nose, the base or lower part of which is divided into four parts, which shall serve for *Hands* seen on the side.

The same measures are observ'd, as well in the *Hand* seen without, as on the back, mark'd A.

To fore-shorten the *Hands*, you must first draw the perpendicular lines from the *Hands* seen slopewise, or aside, mark'd with their proportions and measures 1, 2, 3, 4, (See plate) upon which the sun shining, would so cast them down to the diagonal mark'd at the end with O, and then carry the reflection of them levelly, from the intersection of those perpendicular lines in the diagonal aforesaid, until you come under the place of the fore-shortened *Hands*, thereby to get the shadow, from which shadow you must perpendicularly raise perpendicular lines, till they meet and intersect level lines, drawn also from the first *Hand* seen aside, so will the intersections of the said last nam'd level lines, and raised perpendiculars, give the foreshortened *Hands* A B C D E, even as the eye would see the sideways or sloping *Hands*; and so will the workman see the *Hand* fore-shortened, by the means of the said shadow.

HANDS [in painting in miniature] and the other nudities are to be done as the faces, observing to make the tip or end of each finger a little redder than the rest.

Your work having been coloured and stippled, you must go over all the separations of the parts, with fine touches of *carmine* and *orpiment* together, as well in the shades as in the lights; but stronger in the first, and then handle them away into the rest of the flesh,

ADRIAN HANNEMAN was both a history and face-painter, born at the *Hague*, disciple to one *Ravesteyn*, and came to *England* in the reign of King *Charles* I. He was employed for some time under *Mytens* principal painter to that King, and continued here sixteen years; at the end of which he went for *Holland*, and there drew the Princess Dowager Royal, his Highness the Prince of *Orange*, and all the court. He also drew that piece representing peace in the States-chamber at the *Hague*, also the picture of two usurers telling their gold, for Mynheer *Van Wanwing*; while he was doing this last piece, he happened to want money, whereupon sending to the person he was at work for to borrow some, it was accordingly sent him. When the picture was finished, it was carried home, and the price demanded paid for it; but when Mynheer thought to have the money he had lent (having slip'd the opportunity of stopping it out of meer generosity) he was answered, that the gold that he had borrowed was all put into the picture (meaning that which the  
misers

## H A R

misers were telling) and that he must expect no farther satisfaction. This painter died abroad about forty-six years ago.

HAR. *Holbenius* signifies *Holbenius* of *Harlem*.

HARDENING is the act of communicating a greater hardness to a body than it already has.

The *Hardening* and tempering iron and steel, makes a considerable article in the mechanical arts.

There are divers ways of effecting it; as by the hammer, quenching it when hot in cold water, case-hardening, &c.

To *Harden* and temper *English*, *Flemish*, and *Swedish* iron, they give it a pretty high heat, then suddenly quench it in water to make it very hard. *Spanish* and *Venice* steel need only to have a blood-red heat, and then be quenched.

The workmen sometimes grind *indigo* and *sallad-oil* together, and rub the mixture upon it with a woollen rag while it is heating, and let it cool of it self.

If the *steel* be too hard or brittle for an edge, spring, or pointed instrument, it may be taken down or rendered softer, thus: Take a piece of grind-stone or whet-stone, and rub hard on the work, to take the black scurf off it, and to brighten it; then let it heat in the fire, and as it grows hotter, the colour will change by degrees, coming first to a light goldish colour, then to a darkish goldish colour, and at last to a blue colour. Chuse which of these colours the work requires, and quench it suddenly in water.

*Hammer* HARDENING is mostly us'd on iron or steel plates, for saws, springs, &c.

*Case* HARDENING is perform'd after the following manner: Take cow-horn or hoof, dry it well in an oven, pound it to powder; put as much *bay-salt* as of this powder into stale urine, or *white wine vinegar*, and mix them well together; then cover the iron or steel all over with this mixture, and wrap it up in loam or plate-iron, so that the mixture may touch every part of the work; then put it in the fire and blow the coals to it, till the whole lump has attained a blood-red heat, but no higher, and then take it out and quench it.

HARMONY [in painting.] Some mention a *Harmony* both in the *ordonnance* and *composition*, and in the colours of a picture.

In the *ordonnance* it signifies the union or connexion between the figures, with relation to the subject of the piece.

In the *colouring* it denotes the union or agreeable mixture of different colours.

HARPOCRATES (the God of silence) was represented by the antients in the form of a young child, holding one of his fingers close to his lips, as a sign of *taciturnity*. Some again pourtrayed

pourtrayed him without any face at all, all covered with the skin of a wolf, painted full of eyes and ears.

*To intimate that, it is good to see and hear much, but to speak little.*

HATCHING } in designing, engraving, &c. signifies the  
HACHING } making of lines with a pen, pencil, graver,  
or the like, and the intersecting or going across those lines with  
others drawn over them another way.

The depths and shadows of draughts are usually form'd by *Hatching*.

HATCHMENT is a popular name for an *atchievement*, or an *escutcheon* over a gate, door, or side of an house, with the coat armour of a person deceased.

HATRED is an emotion of the soul, caus'd by the spirits, which incite the soul to desire a separation from such objects as are represented as hurtful to it.

*Hatred* is engendered out of *jealousy*, and as *Hatred* and *jealousy* are so near related to each other, and their external motions almost alike, there is nothing to observe of this passion particular or different from *jealousy*, for which see the plate.

This passion wrinkles the forehead, the eye-brows are sunk down and knit, and the eye-ball is half hid under the eye-brows, which turn towards the object; it should appear full of fire, as well as the white of the eye and the eye-lid; the nostrils are pale, more open, and more marked than ordinary, and drawn backwards, so as to make wrinkles in the cheeks; the mouth is so shut as to shew that the teeth are closed; the corners of the mouth are drawn back, and very much sunk down; the muscles of the jaw appear sunk; the colour of the face is partly inflam'd and partly yellowish; the lips pale or livid.

It is observed, that in *Hatred* the pulse is unequal, lower, and sometimes quicker than ordinary; one feels heats mixt with I know not what sharp and pungent burnings in the breast, and the stomach ceases to perform its functions.

JOHN HAYLES was a good face-painter, contemporary and competitor with Sir *Peter Lely*, was so excellent a copyist, that many of the portraits which he did after *Van Dyck* pass at this day for originals of this prodigious man. He died in *London* in the year 1679, and lies buried in *St. Martin's church*.

H. B. This mark was us'd by *Hans Burkmail*, who engraved thirty-six historical pieces relating to the empire. *Hans Brosanier*, who liv'd in 1538, and *Horatio Borgiani* of *Rome*.

H. Bol. signifies *Hans Bol*, i. e. *John Bol* in certain landscapes.

H. C. signifies *Hans Leifrink* in certain plates of birds, and parties of hunting in friezes.

*The PROPORTIONS of a Body of seven HEADS.*

The length from the crown of the head to the sole of the foot is seven times the length of the *head*. This is a large head, and all the members and limbs are answerable to it, *viz.* strong, sturdy and rais'd.

Yet the antient *Grecians* painted only the goddess *Vesta* in this proportion, it being grave and matron like.

But this proportion may be given to any other goddess which has any kind of grave or solid resemblance, as also to the more stay'd and antient sort of women, to prophetesses, *Sibylls* and such like, whom it would be a great oversight to draw in a slender and delicate proportion; as also to draw a prophet in the proportions of a young man.

To draw a child of six heads, you must divide the whole length of the body into six parts, of which the head must be one.

To draw a child of five heads, the whole length of the body must be divided into five parts, of which the head must be one.

To draw a child of four heads, the whole length of the body must be divided into four equal parts, of which the head must be one.

The proportion of a young man of nine heads. Note, that the proportion of a slender young body of nine *heads* is from the top of the head to the end of the *chin* a ninth part of the whole length, and thence back again to the root of the hair a tenth or eleventh part; this space is divided into three equal parts, whereof the first makes the forehead, the second the nose, the third the chin; but it must be granted, that in a face, which is the eleventh part (by reason of a certain tuft of hair, which is usually express'd) the forehead becomes lower by a third part; which rule the antient *Grecians* observ'd, as is to be seen in their statues.

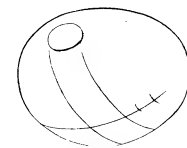
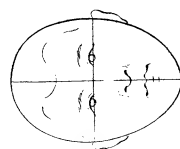
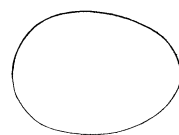
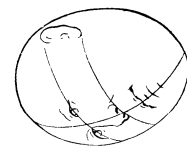
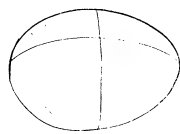
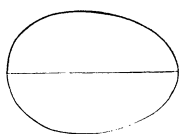
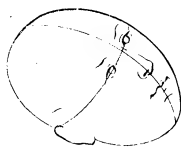
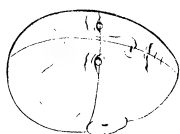
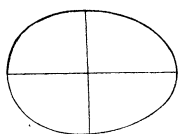
The proportion of a woman of ten heads in length is thus measured: between the top of the head and the sole of the foot is ten times as much as the chin, and the top of the head, and thence to the privities is half.

The proportion of a woman of nine heads, is from the top of the head to the *chin*, a ninth part of the length; the face may be either a tenth or eleventh part, at pleasure. This being divided into three equal parts, the first gives the forehead, the second the nose, and the third the chin. See the article **FACES.**

*To draw a HEAD in profile or sideways.*

The manner to make this *head* by just and safe rules, is thus:

First

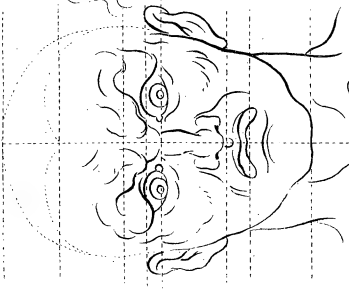






Hope.

Horror.



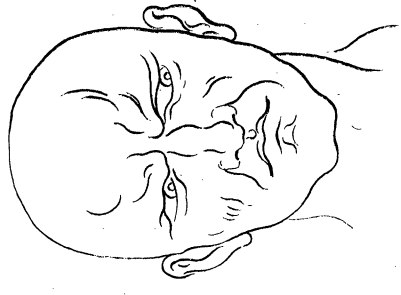
Joy.



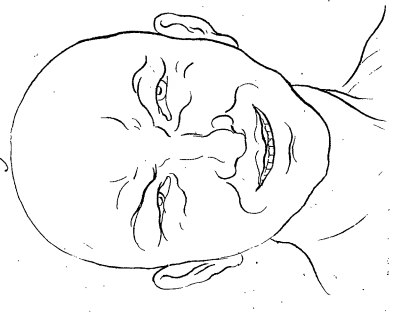
Horror.



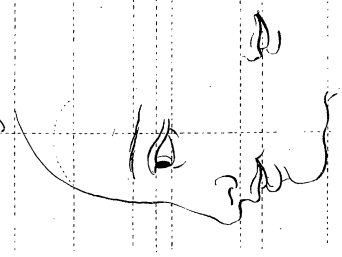
Jealousy.



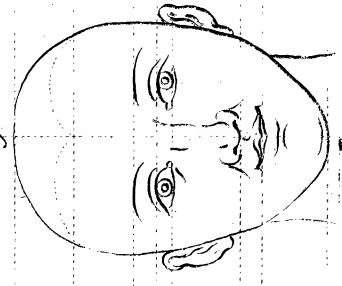
Laughter.



Joy.



Joy.





## H E A

First form an equal triangle, in what position you please, turning the triangle to make the face upon one of the three sides, be it which it will, either upwards or downwards, higher or lower, dividing that side into three equal parts, the one to serve from the lower part of the *hair*, to the lower part of the *forehead*; the second from thence to the under part of the *nostrils*; the third to the lower part of the *chin*.

These three lines being fram'd, draw a little crooked stroke with a *coal* or *chalk*, out of the right line that may reach from the top of the forehead to the *eye-brow*; from whence draw away the slope line, bending at the end.

To place the *nose*, either long, short, gross, or thin, as you would have it, ending that at the second distance, where the *nostrils* end; then subdivide the remaining third part in the midst, where the mouth should be plac'd for the parting of the upper and under lips; then frame the *chin*, having regard to the perpendicular line, that it fall not out of the middle of the *chin*, adjoining thereto the under chin down to the *throat pit*.

Then with the other two dividing lines, the one from the top of the forehead downwards (and ends in the midst of the back-part of the ear) the other proceeds upwards from the *chin*, ascending till that meet with the superior descending line, whose intersection directs the *ear*, that the circumference thereof stretch not too far.

Thus take the upper part of the *forehead*, and describe a great circular line about to form with that the roundness of the *head* unto the nape of the *neck*, keeping the proportion that nature teaches; and from thence downwards form the rest of the *neck*, observing to make the tip of the ear not to exceed the lower part of the *nostrils*.

So you may have the head in what position you please, so this abandon not the other two lines, each concurring in their due points.

*To draw a HEAD with a fore-right face.*

To do this, form a perfect *oval*, which divide in the midst with a line the longest way (*i. e.* a perpendicular line) divide this line into three equal parts, allowing a fourth of one of the three parts for the hair in the *forehead*; the first for the *forehead*, the other for the *chin*.

In the midst of these the mouth is to be formed, always taking care that the eyes be in one line, and the cross-line of the *nose* and *mouth* must always be correspondent to the cross-line, where the eyes are plac'd; and the eyes must be the length of one eye distant from the other, and their inward corners must be perpendicularly over the outside of the nostrils; but to make the ears in a fore-right face proportionable, they must be

# H E I

much foreshortened by *foreshortening*, by which is meant that the eye does not see the full latitude of it.

The proportion of the length of the *ear* is from the *eye-brows* to the bottom of the nostrils, and then it is to join the neck with the hair in such a manner as may be most agreeable to the eye.

## *Of the HEAD in foreshortening.*

Make a circular draught, with the aspect upwards or downwards, as in the fore-right head, where the traverse lines are strait, but these go circular; for if the heads fly upwards, the traced strokes and divisions must be rais'd with caution, that the *ears* and *eyes* fall not out of their due points.

## *Measures or HEIGHTS, and diminution of elevated FIGURES.*

As to the diminution of figures, when plac'd on high, we are to take our measures in proportion for such as are to be rais'd in paintings, when they be plac'd on mountains, houses, or above the clouds in the air. The two rules we have now to give will render the method extremely easy.

For the first, I suppose the man A to be six foot; which height I set off several times on a perpendicular B over the base-line 6, 12, 18, &c. draw lines to the head of the figure A; then setting one point of the compass at letter A, with the other describe the arch CD, and the intersection that arch makes with the rays, are the measures to be given the figures.

Thus, if you would have a figure appear forty-two foot high above the same base-line; take ED, which cuts the two last rays, and set it off to F, which is forty-two feet above the same base AB.

If another be required thirty feet high, you must take the distance GH, which cuts the rays 30, 36, and gives the height of the figure P, and so of the rest.

The main point is the approaching or receding of the line B, which must always be the distance between the spectator and the object, *viz.* thirty feet, or thereabouts. See PLATE, fig. 1.

For the second rule; instead of the line B, us'd in the first figure, the division is made from six feet to six on the base-line IT. The two first points 1 and 6 are to be drawn to the point of sight K. Thus between the two rays IK and 6 K, you have the measure of six feet, which is the height to be given the figures. Then from all the other divisions, 12, 18, 24, 30, &c. draw lines to the point of distance L; and in the intersections made by the ray 6 K, draw little parallels to the base line between the rays IK and 6 K. These parallels will give the heights of figures unequally high, but at the same distance; which

which may be prov'd by comparing the measures of the first method with those of the second. See PLATE, fig. 1.

If it be ask'd how much each figure is diminished from the first, which is six foot high, you need only to take the height of the figure required in your compasses, and set it off on your little scale M in the first figure, and your question is solv'd.

Thus having taken the height of the figure B, and set it on the scale M, it gives four feet, which shews that a figure six feet high, rais'd thirty feet will appear to be but four feet. The heights and diminutions of the rest are found by the same operation, provided the distance be the same with that of these. If the distance be chang'd, the process must begin anew.

The figures V, X, Y, which are in the clouds in the second figure underneath, are of the same height and proportion as in the first figure. They are only here added to shew, that tho' the method be different, the effects are the same.

What has been said as to the heights and diminutions of figures on the base line AB in the first method, and IT in the second, must be observed in proportion as they are sunk further behind; and the highest must have the same relation to those under ground which are in the same line as this FP to that A. Thus in the second rule, if over against the left figure N there were another figure O placed on a tower forty-eight or fifty feet high, and its magnitude required, it must be put in the same proportion as N has to I.

And inasmuch as the last N only contains two and a half of the six parts which I contains, this O upon the tower must only have two and a half of the six parts in the figure N.

If you would have another figure R on another tower forty-eight or fifty foot before the figure Q, take two parts and a half of the figure Q for the height of the figure.

If another were required in S, which is thirty feet high in the same tower, then take four of the six parts of the figure Q; that is, four foot, as already mentioned in the first method between the rays G and H.

What renders this rule the more valuable is, that all the proportions of figures may be learn'd by heart; for whoever would be at the trouble of making this measure, where he might add more parts, they would serve him for ever, and he would render them so familiar, that in a little time he would be able to tell off hand, that if you are at thirty-five feet distance, and the figure six feet or six parts high when on the ground; another that shall be of the same size, will only appear five foot and a half, when rais'd to the height of twelve feet; and but five, if rais'd eighteen feet; but four and a half, if twenty-four feet; but four, if thirty; but three, if thirty-six; and two and a half,

if forty-two; and so on by six and six to any number you please.

*To find the HEIGHT of remote figures, whereof the first is on a mountain near the eye.*

It is a thing that gives a great deal of satisfaction to the mind, when a person knows what he does; on which account it is presumed that the reader will be well enough pleased to have the following rule.

When such figures are to be made, determine the height of the first, that is the space of ground you would have it rais'd; and at that distance put another figure underneath, of the same height as the first; and from the feet and head thereof, draw lines to the horizon, by which you will have the height of the other figure in the champagne. To explain my self,

The figure A for example, which is a top of a mountain, is five foot high, which is the natural height; and I suppose the mountain twenty-five feet high. If now a man be rais'd twenty feet, as is the piece in the middle, whereon the spectator is mounted (who himself is suppos'd to be five foot high) the horizon will be twenty-five foot high, as well as the mountain, and consequently will raise the top of the mountain.

Now to find the height of the little people in the champagne, make a figure twenty-five foot lower, underneath the figure A, or in some other place, as B C; and from the feet B, and the head C, draw lines to some place in the horizon, as the point O; and between those two lines B and C drawn to O, take the height of the figure D, draw a parallel to the base-line till it cut the line B in the point E, from which a perpendicular is to be rais'd, cutting the line C O in the point F; and take the height of this perpendicular E F for the height of the figure in the point D.

If you likewise require the height of the figures in the points G and H, proceed after the same manner as in the figure D, and you will have their heights between the lines B and C, to be taken in the compasses, and set off in the points G and H.

The same you are to do for any other figures, still diminishing, till at length you come to a mere point.

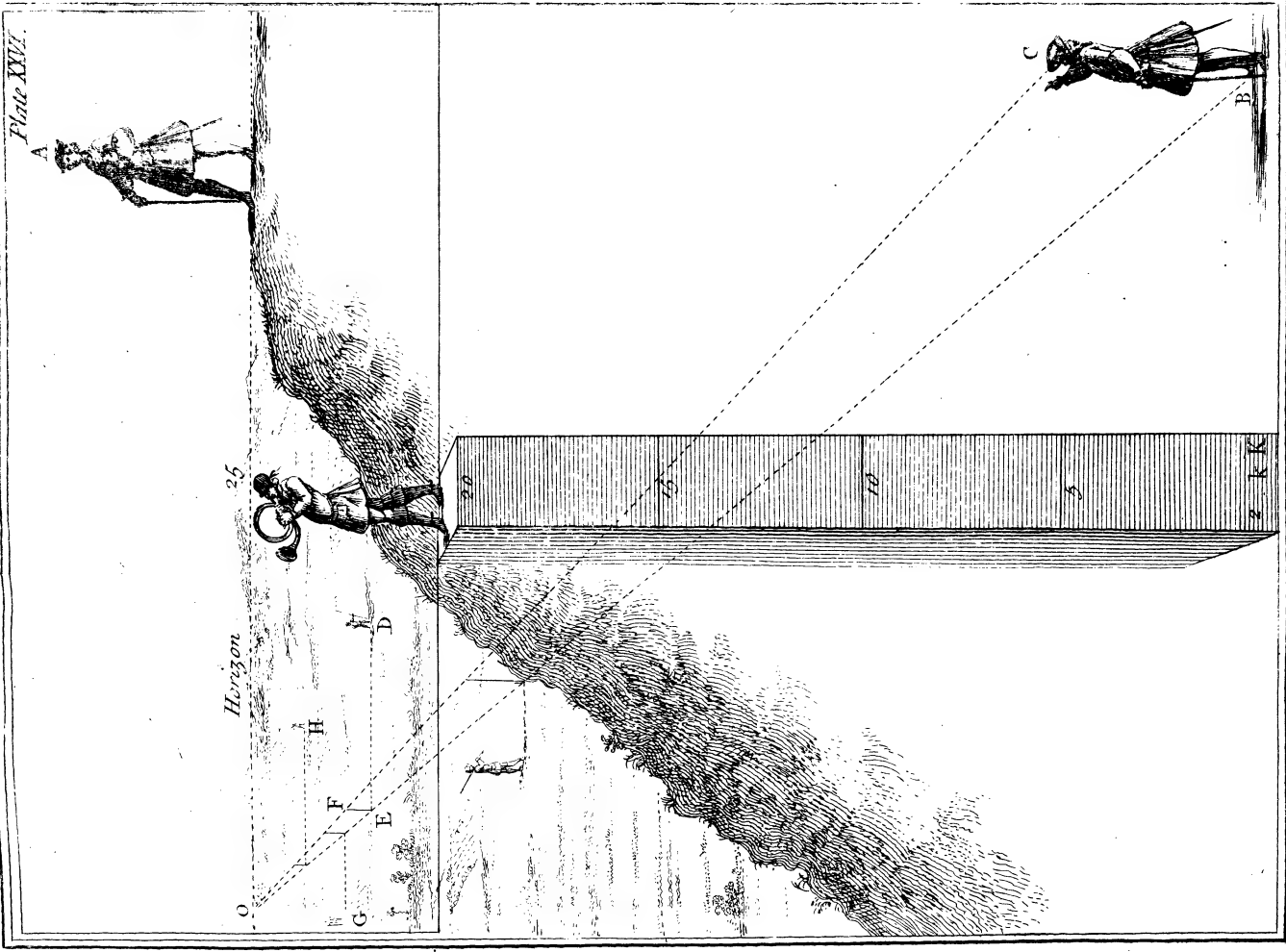
HELLEBORE [in miniature.] The flower is done by laying on white, and shading with *black* and *bistre*, making the outside of the leaves a little *reddish* here and there.

The seed must be of a deep *green*, heightened with *masticote*.

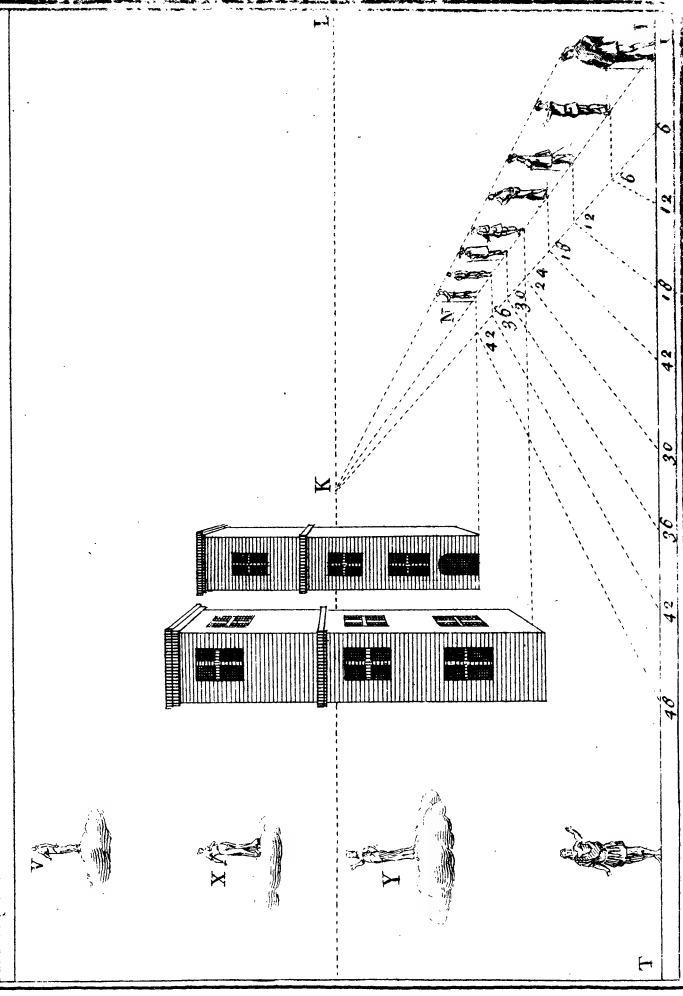
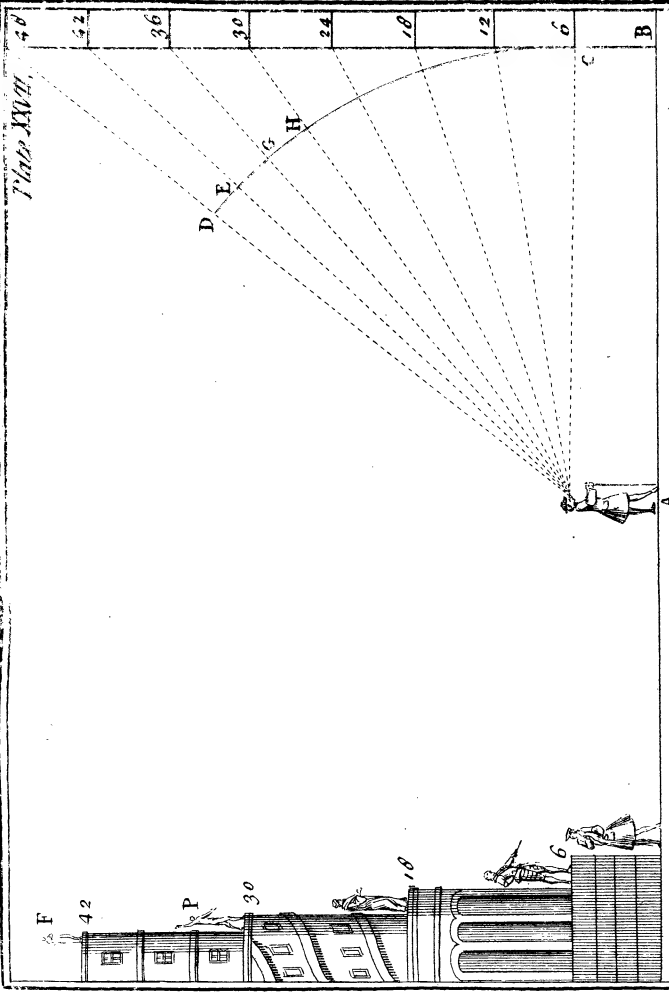
The green must be sad, and is to be done with *verditer*, *masticote*, and *bistre*, and finished with *iris-green* and *bistre*.

EGBERT HEMSKIRK was born at *Harlem*, and disciple of *De Grebber*. He became very eminent for painting drolls after the manner of *Brawer*. His comical genius succeeded for  
a long











a long while amongst us in most of his conversation-pieces; you may see all the pictures and read the manners of the men at the same time, a thing chiefly aim'd at. His drunken drolls, his wakes, his quakers meetings, and some lewd pieces have been in vogue amongst waggish collectors, and the lower rank of virtuosi. He often introduced his own picture among his drolls by means of a looking-glass he had upon his pallet. He was a man of wit, and therefore valued by the late Earl of *Rochester*, for whom he painted several pieces. He died in *London* about forty years ago, leaving behind him a son, whom he had instructed in his way.

MARTIN HEMSKERK, born in the year 1498, scholar of *Jean Lucas* and *Schoorel*, liv'd in *Holland*, excell'd in history, died in 1574, aged seventy-six years.

HERESY is represented in painting by an old, lean hag of a terrible aspect, flames issuing out of her mouth, her hair hanging disorderly about her breasts, and most of her body bare; her dugs flagging; in her left hand a book shut up, serpents coming out of it, and with her right seems to scatter them abroad.

Her oldness denotes her inveterate malice, because deprived of the light of faith; the flame denotes impious opinions; her breasts shew that vigour is dried up, that she cannot nourish good works; and scattering serpents, the dispersing false doctrines.



CORNELIUS HEVISSEN us'd this mark.

JOHN VANDER-HEYDON was a good face-painter, and a native of *Brussels*, coming over to *England*, he worked for Sir *Peter Lely* in his draperies, and copying several years, till afterwards marrying, he went into *Northamptonshire*, where he was employed by most of the noblemen and gentry of that country. There are several of his pictures to be seen in those parts, especially at my Lord *Sherrard's*, and at the Earl of *Gainsborough's* and at *Belvoir-castle*. He died about thirty years ago at my Lord *Sherrard's*, and lies buried at *Stapleford* in *Leicestershire*.

NICHOLAS HILLIARD was a celebrated *English* limner, drew Queen *Mary* of *Scots* in water-colours when he was but eighteen years of age, wherein he succeeded to admiration, and gained a general applause. He was both goldsmith-carver and limner to Queen *Elizabeth*, whose picture he drew several times; particularly once, when he made a whole length of her sitting on her throne, which piece was deservedly esteemed. There are moreover two wonderful pieces of his, now in possession of *Simon Fanshawe*, Esq; and by him valued, not without reason, as

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it's the opinion of good judges, at above fifty guineas each, tho' not much bigger than a crown. One of these is the picture of our artist himself.

The other is the picture of his father, sometime High Sheriff of the city and county of *Exeter*.

These two pictures in miniature are so masterly done, that not only the faces are finely coloured, and naturally with a good relievo; but also the heads and beards are so well perform'd, that almost each single hair is express'd.

**HISTORY** [in painting] is a picture compos'd of divers figures or persons, representing some transaction or piece of *History*, either real or feigned.

Painters are distinguished into portrait-painters, flower and fruit-painters, landscape-painters, painters of beasts and *History*-painters; and the first place or rank is universally allow'd to *History*-painters, as the most difficult, masterly, and sublime province.

**HISTORY-Painter.** A good *History-Painter* ought to understand all things, because he is to represent all things; he ought to be naturally a quick, free, good inventor and designer, as also to know well how to order and stell his figures after that manner (if there be many in one piece) that they may not seem to be crowded; but to order them gracefully on the foreground especially, and the rest of the figures to lessen and decline proportionably, both in height and strength by degrees at their several distances.

And a *History-Painter* must of necessity understand anatomy, arithmetick, architecture, geometry and perspective, &c. and not only the true shape of man's body, but of all other creatures whatsoever, and all the shapes and forms that are in the world.

**HISTORY** is represented in painting by a woman resembling an angel with great wings, looking behind her, writing on an oval table, on the back of *Saturn*.

The wings denote her publishing all events with great expedition; her looking back, that she labours for posterity; her white robe, truth and sincerity; *Saturn* by her side denotes time, and the spirit of the actions.

**WENCESLAUS HOLLAR** was a gentleman born at *Prague* in *Bohemia* in the year 1607. He was much inclined to miniature and etching, in which last art he became exceeding famous. In the year 1627, he left *Prague*, and visited many cities of *Germany*, when coming at last to *Colen*, he waited upon the Earl of *Arundel*, that truly great and noble patron of arts, who was there on his embassy to the Emperor at *Vienna*, and afterwards came over with him to *England*. He lived here  
for

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for some time, and drew many churches, ruins, persons, and views, which he afterwards etched, which will always be in good esteem. His particular excellency was etching: there are a great number of his prints in *England*. He at last got into the service of the Duke of *York*; but upon the breaking out of the civil wars, retired to *Antwerp*, and there died.

**HANS HOLBEN.** His manner was extraordinary and unusual, differing both from the antients and moderns, so that it seems as if he had not been incited or instructed by any example, but rather that he followed purely the dictates of his genius. There is nothing to be seen of his doing but what is painted to the utmost perfection: this is manifest by that piece of his of death's dance in the town-hall at *Basle*, the design whereof he first cut neatly in wood, and afterwards painted, which appear'd wonderful to the learned *Erasmus*. He requested of him to draw his picture, desiring nothing so much as to be represented by so judicious a hand.

This being perform'd, and *Erasmus* thinking that he deserved a more plentiful fortune, he persuaded him to come for *England*, promising him considerable advantages from the bounty of King *Henry VIII*. At his request, *Holben* set out for this kingdom, bringing along with him *Erasmus's* picture, and letters of recommendation from that great man, to the then Lord Chancellor Sir *Thomas More*, who received him with all joy imaginable, and kept him for three years at his own house; during which time he drew his picture, and those of many of his friends and relations, all which were hung up in the great hall of that house. The King coming one day to dine with Sir *Thomas*, and at the entrance into the hall beholding so many ravishing objects, the pictures seeming almost as live as the persons, who were all there present, his Majesty so much admired the excellency of the painter, that the next day he sent for him, and entertained him in his service upon very advantageous terms: the King from time to time manifested the great esteem and value he had for him.

**HANS HOLBEIN**, born in 1498, scholar to his father, liv'd in *Switzerland* and *London*, excell'd in history and portraits, died in 1554, aged fifty-six years.

**ABRAHAM HONDIUS**, born at *Rotterdam* in the year 1638. He was a painter whose manner was universal; he drew history, landscapes, ceilings and small figures; among all the rest, beasts and hunting pieces were all his study. In all these kinds his colouring was often extravagant, and his draught as commonly uncorrect. He delighted much in fiery tinct, and a harsh way of penciling; so that few of his pictures being without this distinguished mark, his paintings are easy to be known.



## H O R

His dogs and huntings are in good request, though some of his latter were careless, he being for many years afflicted with the gout so severely, that he had prodigious swellings and chalk stones in most of his joints; the effects of a sedentary and irregular life. This distemper occasion'd his death in *London* about the year 1691.

**HOPE** is a strong appearance or opinion of obtaining that which one desires.

*Extreme Hope* becomes security; and on the contrary, extreme fear is turn'd into despair.

But the motions of this passion being not so much external as internal, we shall speak but little of them, and only remark that this passion keeps all the parts of the body suspended; between fear and assurance, in such a manner, that if one part of the eye shews signs of fear, the other part intimates security; and so in all the parts of the face and body, the motions of these two passions are participated and intermix'd. See the plate.

**HOPE** is represented in painting by a beautiful young girl in a long robe, hanging loose, standing upon tip-toes, and a trefoil or three-leav'd grass in her right hand, and an anchor in her left.

*The loose vestment intimates, that she never pinches or binds truth; her posture, standing on tip-toes, shews she always stands dangerously; the branch of trefoil denotes knowledge (the ground of faith) faith (the ground of hope) and hope itself.*

**HOPE** is also represented as a young woman, clad in green, with a garland of flowers, holding a little *Cupid* in her arms, to whom she gives suck.

The flowers denote *Hope*, they never appearing without some hope of fruit; the *Cupid*, that love without hope grows languid, and is not lasting, as on the contrary, 'tis desperate, and soon at an end.

**LAMBRECKT HOPFER**, a *German*, engrav'd all kinds of subjects. Sometimes his mark is a vase of flowers in the midst of the letters L H or the perpendicular stroke of the L struck off the H. He engrav'd twenty-seven pieces on the passion.

### *To soften HORNS.*

Take urine a month old, *quick lime* two pounds, *calcin'd tartar* one pound, *crude tartar* and *salt* of each half a pound; mix and boil them all together; then strain out the liquor twice or thrice; put in the horns, let them lie and soak for eight days, and they will become soft.

### *Another way.*

Take *ashes*, of which glass is made, and *quick lime* of each two pounds; boil them in a sufficient quantity of water, till one  
third

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third part is consum'd ; then putting a feather into it, if it peels, it is boil'd enough ; if not, boil it longer ; and when it is enough, clarify it, and pour it off, and put filings of horn in it for two days ; anoint your hand with oil, and work them as if they were paste, and into what form you please.

*Another way.*

Mix juice of *marubium*, *alexanders*, *yarrow*, *celandine* and *radish roots* with strong *vinegar* ; put in the *horn*, and let them digest for a week in horse-dung, and then you may work them as before.

*To cast HORN in a mould like lead.*

Make a *lixivium* of *calcin'd tartar* and *quick lime* ; into this put your filings or scrapings of *horn* ; boil them well together till they come to a pap, tinge this of what colour you would have it, and you may afterwards cast it in a mould, and make of it any thing of what form you please.

*To dye HORNS, &c. RED.*

First boil the horns in *alum water* ; then put it into tincture of *Brazile* in *alum water* for fourteen or twenty days, or into a tincture of *Brazile* and *milk*.

*To dye HORN BLUE.*

First boil it in *alum water*, then put it into a dissolution of *indigo* in *urine*.

*To dye HORN of an emerald GREEN.*

Put as much filings of *copper* into *aqua fortis* as it will dissolve, then put in the *horn* for one night.

HOROGRAPHY is represented in painting by a young virgin winged, clothed in a short robe of sky colour, with an hour-glass on her head ; in her right hand she holds instruments for dialling, and in her left hand a sun-dial ; the sun over her head shewing with its rays the shadow of the gnomon directed to the hour current.

Her youth denotes the hours continually renewing their course successively ; the curtail'd coat and wings, the rapidity of the hours ; the sky-colour, the serenity not prevented by clouds ; the hour-glass shews the time of night, as the other does that of the day.

HORROR, an object despised or scorn'd sometimes causes *Horror*, which, if instead of *scorn* it raises *Horror*, the eye-brow will be still more frowning than in that of *scorn* ; the eye-brow will knit and sink a great deal more, and the eye-ball, instead of being in the middle of the eye, will be drawn down to the under-lid ; the mouth will be open, but closer in the middle than at the corners, which being drawn back, makes wrinkles in the cheeks ; the colour of the visage will be pale, and the

# H O U

the lips and eyes something livid. This action has some resemblance to *terror*. See the plate.

In *Horror*, the motions should be much more violent than in *scorn* or *aversion*, the body violently retiring from the object which causes the *Horror*. The hands should be wide open, and the fingers spread; the arms drawn in close to the body, and the legs in an action of running.

*To dye or colour HORSE-HAIR, or any hair, &c.*

Steep the hair in water, in which a small quantity of *turpentine* has been boil'd for the space of two hours; then the colours being prepar'd and made very hot, boil the hair therein, and any colour will take, *black* excepted, and that will only take dark *red* and dark *blue*, &c.

And after this manner with colours cold, or but luke-warm, you may dye the feathers upon the backs of poultrery, wild-fowl, hair on dogs, horses or the like, and in as much variety as your fancy shall lead you to.

JOHN HOSKINS was an eminent limner in the reign of King *Charles I*, whom he drew with most of the court. He was bred a face painter in oil; but afterwards taking to miniature, he far exceeded what he did before. He died in *Covent-Garden* about eighty years ago. He had two considerable disciples, who were *Alexander* and *Samuel Cooper*, the latter of which became the most eminent limner.

HOSPITALITY is represented in painting, by a lovely woman, her forehead surrounded with a crown set with jewels, with her arms open to relieve somebody; holding a *cornucopia* full of all necessaries, clad in white, and over all a red mantle, under which she holds an infant naked, seeming to participate some of the fruit with her, and a pilgrim lying on the ground.

Her handsomeness intimates, that works of charity are acceptable to God; the golden circle denotes her thinking of nothing but charity. Her white raiment shews, that *Hospitality* ought to be pure.

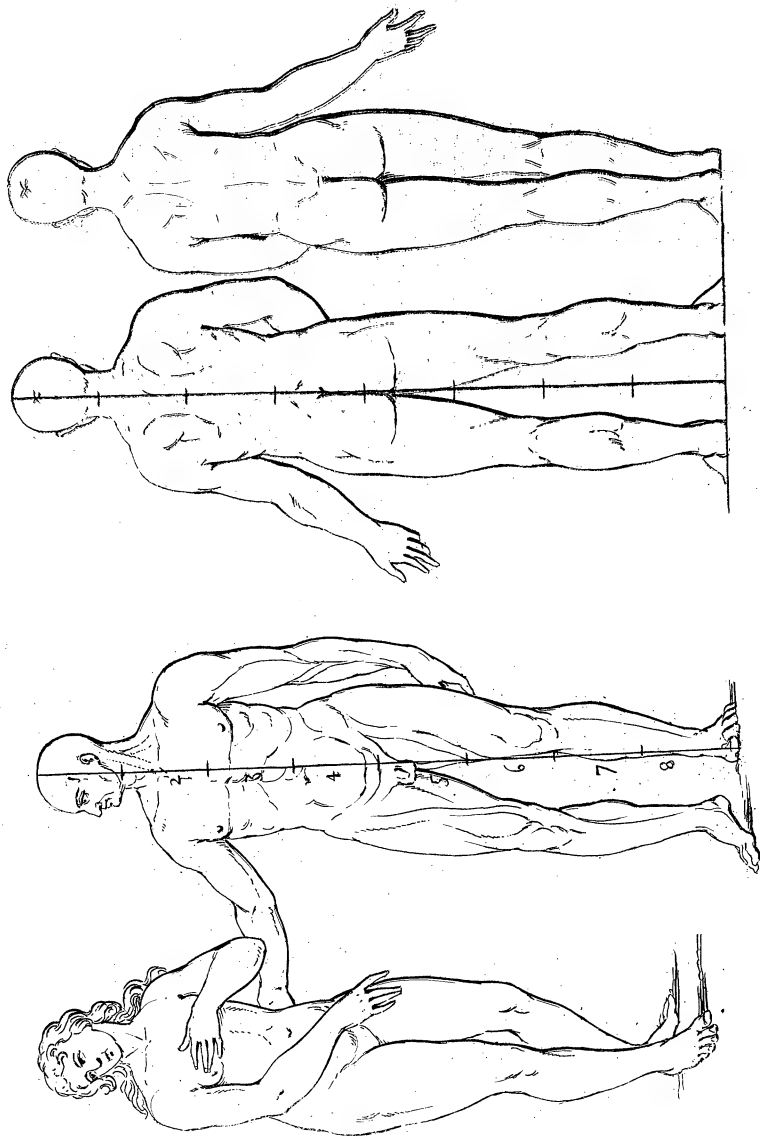


VUAER VAN HOSSANEN, engrav'd twelve round plates of the *Passion*, and underneath various symbols of our Saviour. He likewise engrav'd the life of Christ in sixty plates. He us'd this mark.

HOUSES or BUIDINGS *view'd by the angles in perspective*.

Of these two buildings seen angle wise, the first is perform'd after the manner of squares view'd the same way, and elevations of other things in side views.

However, to save the trouble of recurring to the one and the other, I shall here observe, that to perform such buildings, the measures must be set on the base line, and from each of them  
lines





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lines are to be drawn to the point of distance; and from the points of intersection, perpendiculars are to be raised; the first angle serving for a line of elevation.

Thus in the present building the breadth being A B, and the length B C double its breadth; from A and B lines are to be drawn to the point of distance D; and from B and C to the point of distance E.

Then observing where B D or B E are intersected thereby; raise the posts of the windows therein. The perpendicular of the first angle B serving for a line of elevation, will give the cross pieces and the height of the windows, the rest is obvious.

As to the figure underneath, the method is the same as for chairs plac'd irregularly, *i. e.* having made the plan put it in perspective, as irregular objects are put; then laying a ruler along each side of the plan, observe where it cuts the horizon, and marking the points draw lines thereto from each part of that side of the building.

Every face or side of a building has its particular point.

Thus the plan being put in perspective; the side H I gives the point K on the horizon, to which all the rays on that side must be drawn.

The other side I L, should likewise have its point; but for want of paper room it could not be here express'd.

Having found these two points, lay a ruler upon it, and an occult line over the other side of the building parallel upon the plan, parallel to that which gave the point in the horizon, and continue it to the base line, as from R through L to M; and from the other point continue an occult line through H to N.

Then setting the number of windows on the side H I, between N and I, and between I and M setting the number of the windows on the side I L; draw lines from all these points or measures on the base line to the point in the horizon, and proceed as in the figure above.

JAMES HOUSMAN alias HUSYMAN was a history and face painter, who resided in *England* in the time of Sir *Peter Lely*, and endeavoured to rival in the portrait way. He was born at *Antwerp*, and bred up to painting under one *Bakerrel*, who was brought up with *Van Dyck* in the school of *Rubens*. This *Bakerrel* was not much inferior to *Van Dyck*, as is to be seen in several churches in *Antwerp*, especially of that of the *Augustin* monks, where *Van Dyck* and he have painted to out do each other, and both had commendations in their different ways; though the superiority was yielded to neither. But *Bakerrel* being a poet as well as a painter, he wrote a satyr upon the  
jesuits

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jesuits on which account he was forced to leave the city of *Antwerp*, so that *Houfman* having by that means lost his master, came for *England*; some of his history pieces are well painted, his colouring being bright and sanguine, and in the airs of his faces he out did most of his countrymen, who often know better how to perform the painting part, than to choose the best life or execute agreeably any design; some cupids of his were much admired, but what he valued himself most upon was the picture of *Catherine* the Queen Dowager of *England*. This picture did him great service, so that he was always boasting of that performance, he call'd himself her Majesty's painter. He carried the compliment yet farther, for in all historical pieces for a *Madonna*, a *Venus*, or any suitable figure, he always introduced something of her resemblance, the most famous piece of his performance was over the altar of that Queen's chapel at *St. James's*, now a *French* church. He died in *London* about fifty years ago, and lies buried at *St. James's*.

H. S. 1558. stands for *Hercules Septimus Mutinensis*, in certain figures and ornaments of building.

H. V. C. 1517. signifies *Hans vel Culibac*, who was scholar to *Albert Durer*.

HUMILITY is represented in painting, by a virgin all in white, her arms across upon her breast, her head inclined, a golden crown at her feet.

The white robe shews the purity of the mind, begets submission, holding down her head, confession of her faults; treading on a crown shews *Humility*, disdaining the grandeur of the world.

HYACINTH. The flower is of four sorts:

1. A deep blue.
2. A paler blue.
3. A gridelin.
4. A white.

To paint them in *miniature*.

For the first use *ultramarine* and *white*, shaded and finish'd with less *white*.

For the second, make that of a paler blue.

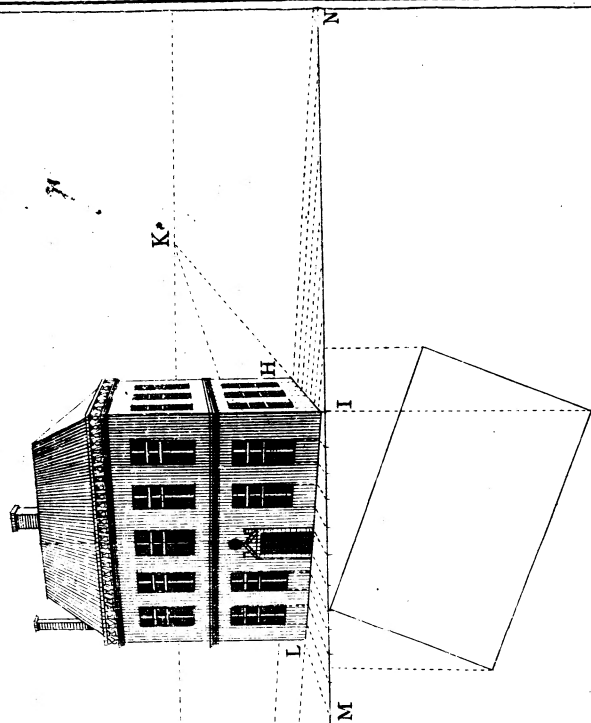
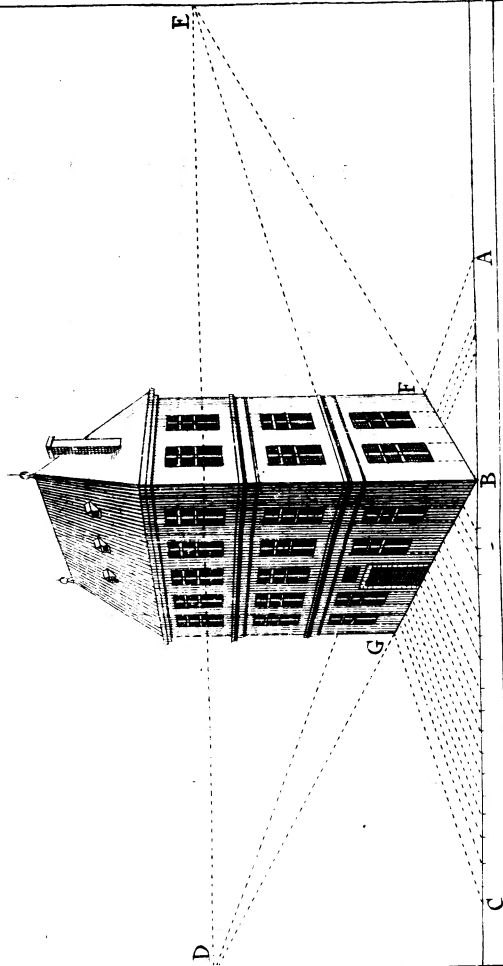
For the third, use *lake* and *white* and a very little *ultramarine*, and finish it with the same colours; but of a deeper degree.

The fourth must be all white, and then shaded with *black* and a little *white*; finish with strokes of the same turn, with the out-line of the leaf.

The green and stalk of the blue kind, must be of the sea sort, shaded with a very deep *iris*, and in the stalk of the first, you use a little *carmine* to give it a reddish cast.

The







## H Y P

The stalks of the two others, and their greens must be coloured with *verditer* and *masticote*, shaded with *bladder green*.

HYDROGRAPHY is represented in painting, by an ancient matron in a cloth of silver garment, the ground of which resembles the waves of the sea; stars above, in one hand a chart of navigation and the compasses; in the other, a ship and the mariners compass on the ground before her.

Her garment signifies the water and motion thereof, which is the subject of *Hydrography*; the compass the regulating and describing by the help of it; the chart shews all the winds, and the surest way to sail.

HYPOCRISY is represented in painting by a meagre pale woman in a linsy-woolsey garment, her head inclining to the left; her veil covers most of her forehead, with beads and a mass book; she puts forth her arm in the assembly to give a piece of money to some poor body with legs and feet of a wolf.

Linsy-woolsey, the linen denotes malice, and the woollen simplicity; her head inclined, with the veil covering her, all shew *Hypocrisy*; the offering money, vain glory; her feet, that outwardly she is a lamb, but inwardly a ravening wolf.

## F I N I S.



